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THE

JOURNAL

OF

GAS LIGHTING,

WATER SUPPLY,

Etc.

VOL. XC.

APRIL TO JUNE, 1905.

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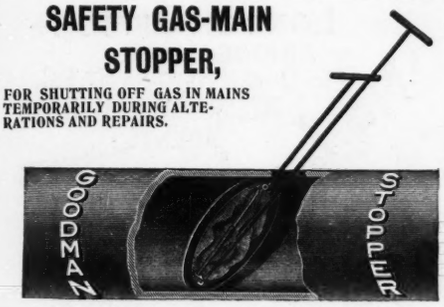

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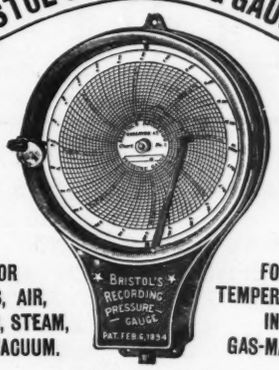

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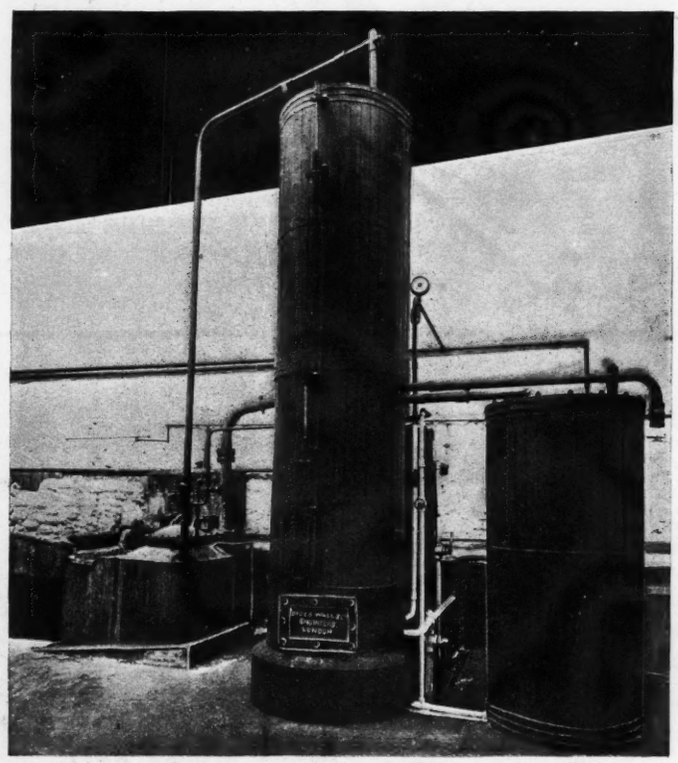

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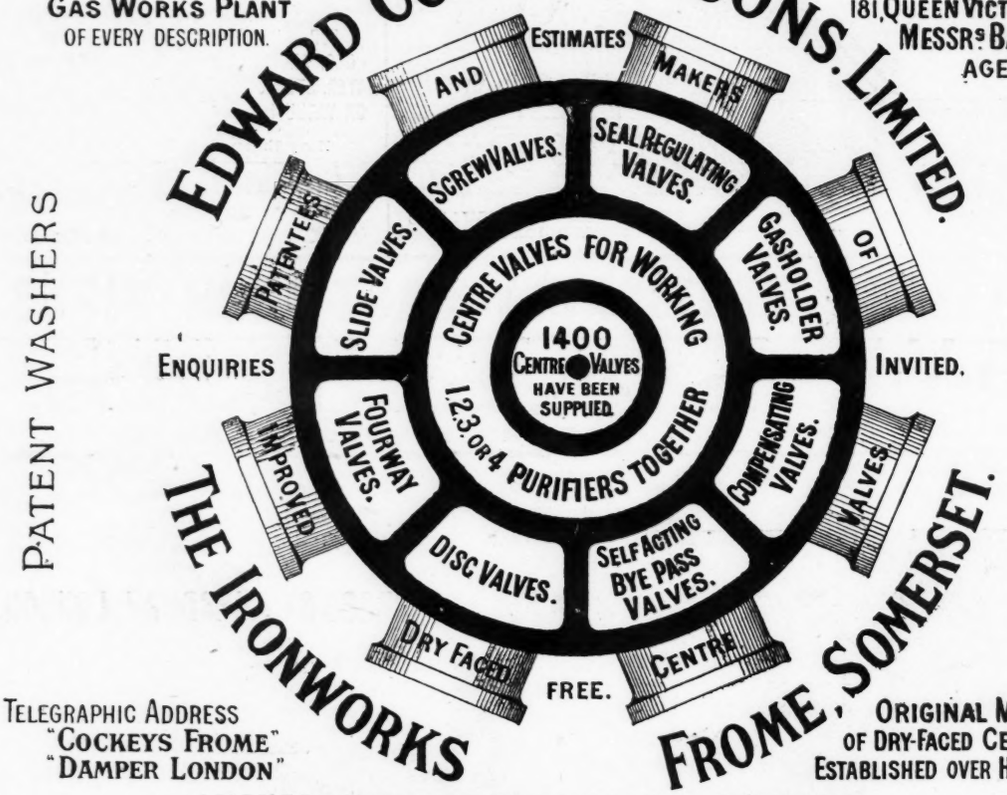

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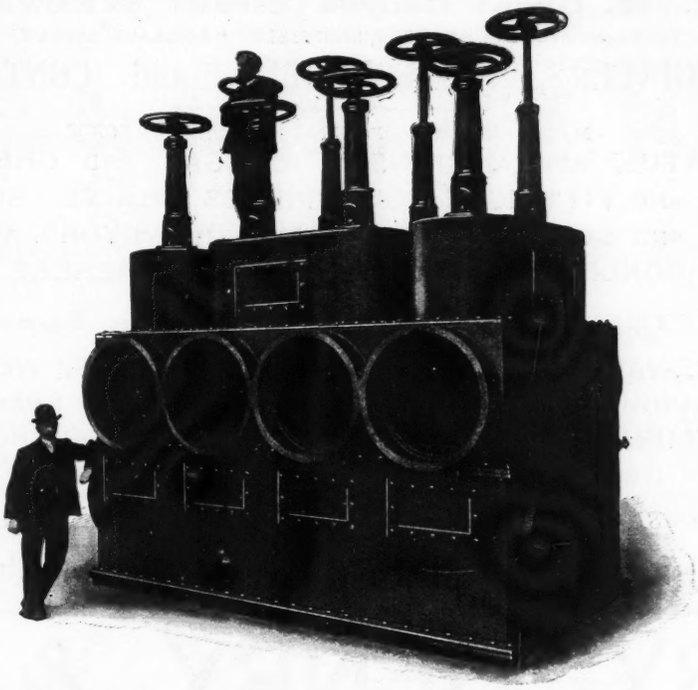

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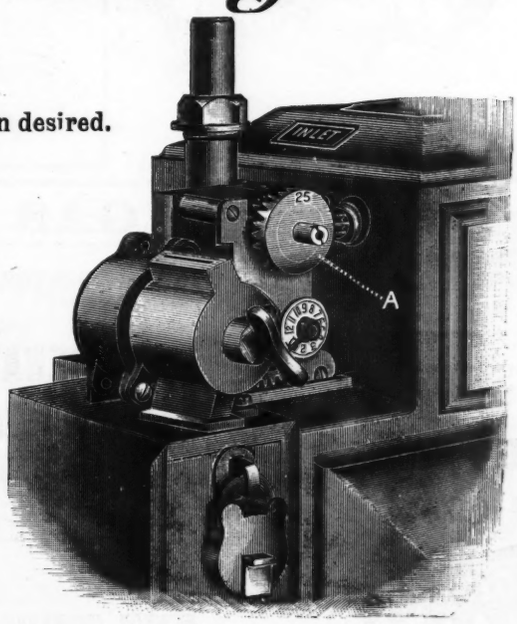

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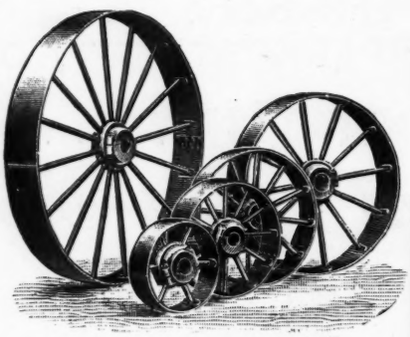

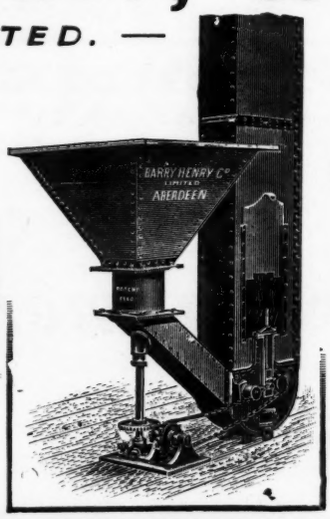

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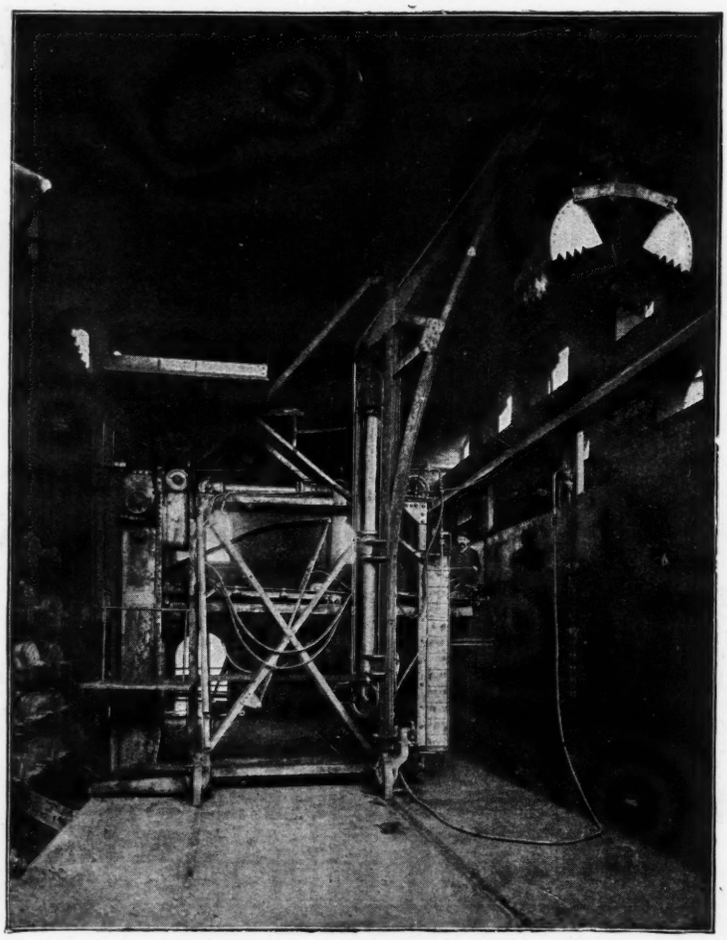

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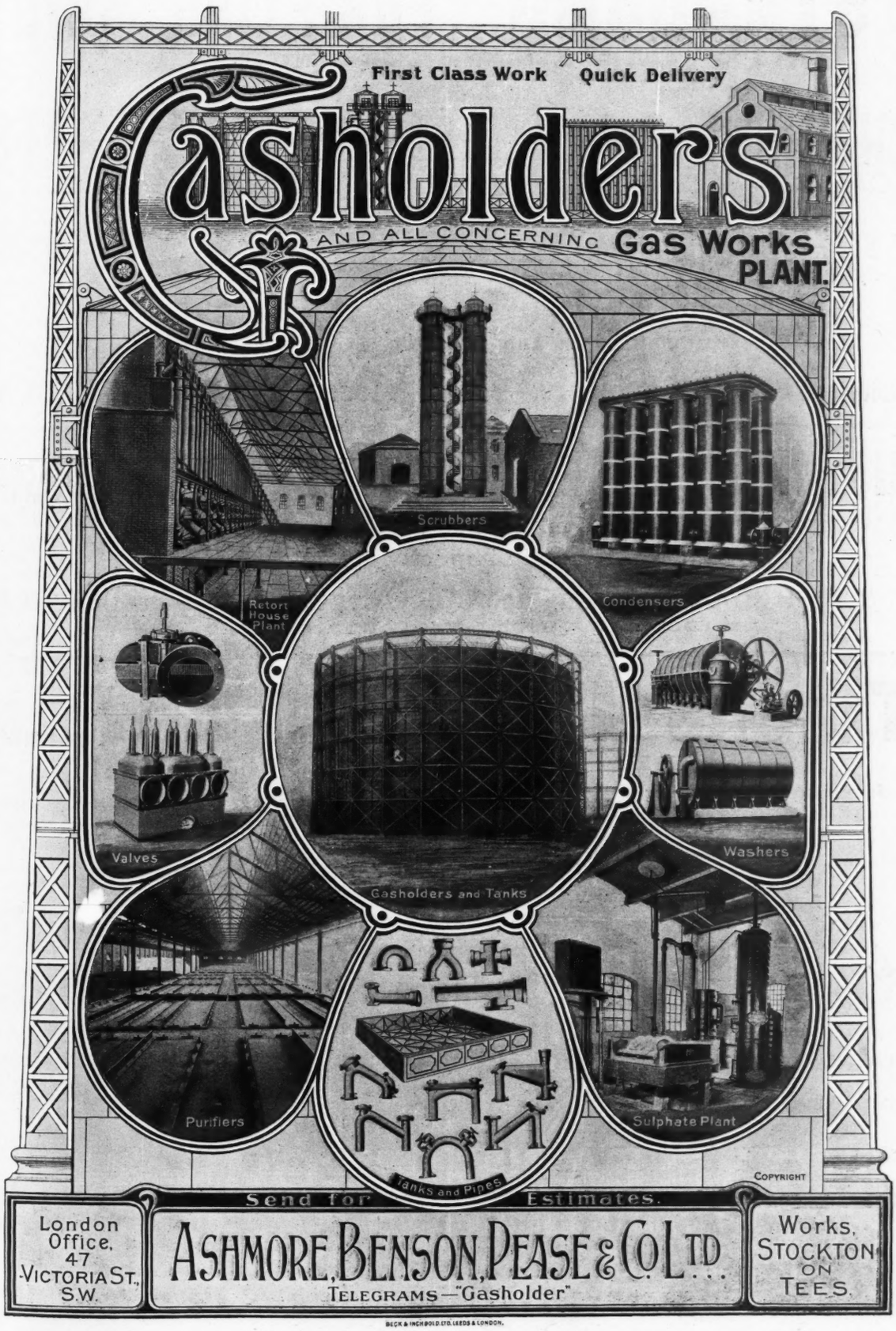

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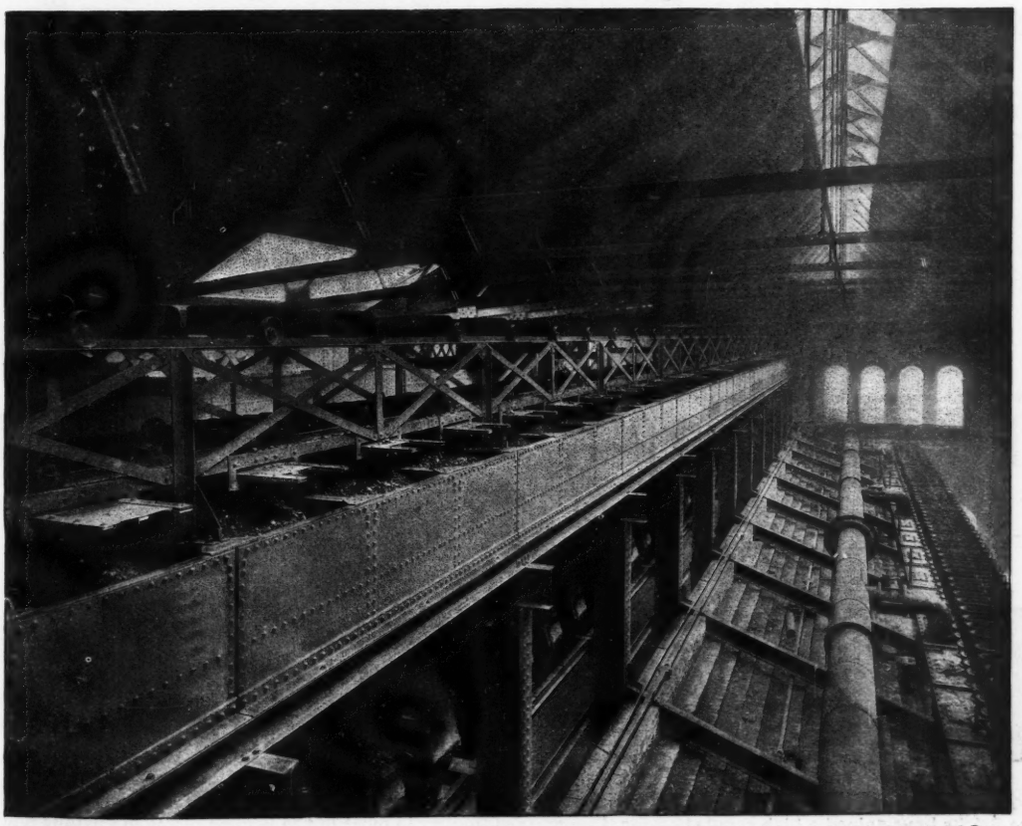

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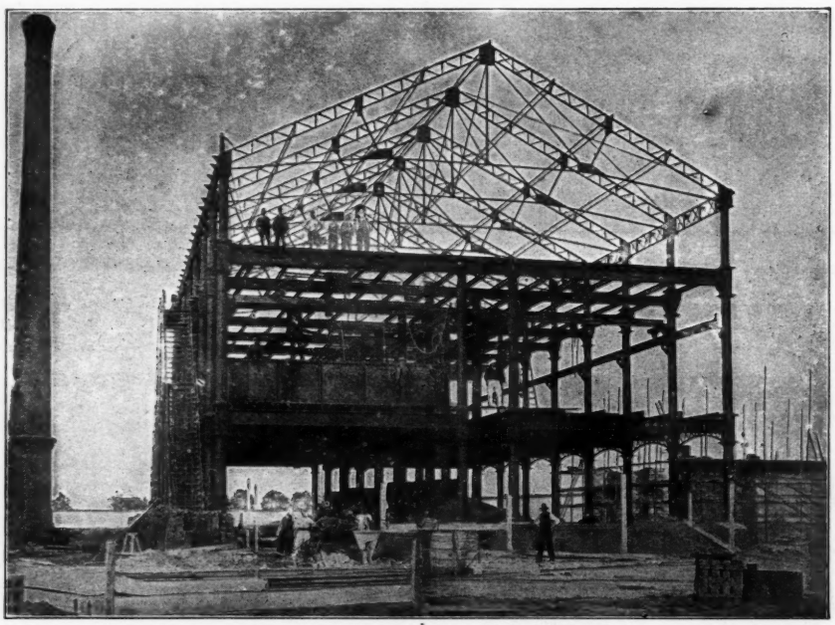

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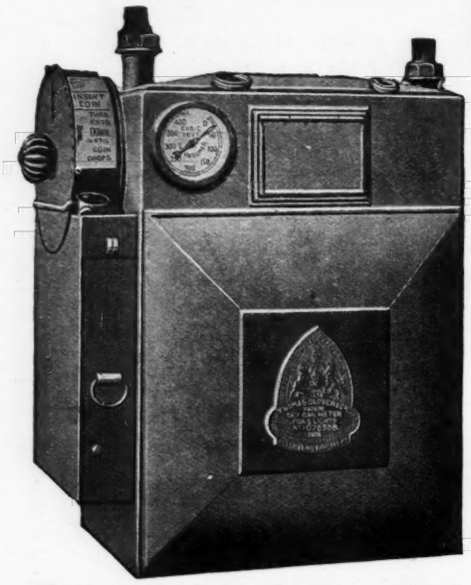

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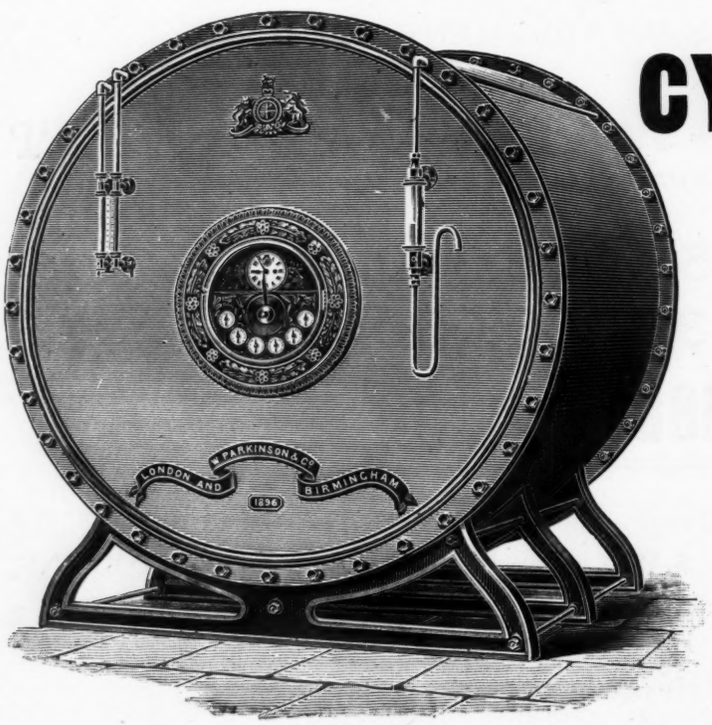

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JOURNAL OF GAS LIGHTING, WATER SUPPLY, &c.

EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON.

VOL. XC., No. 2186.—TUESDAY, APRIL 4, 1905.

EDITORIAL NOTES—GAS, &c.

Gas Companies and Local Expenditure.

IT is impossible to smother consideration of the question of the ominous and unceasingly growing expenditure of our local authorities. The evidence of it is only too apparent everywhere. On our private rate-papers, in the accounts of the industrial enterprises in which individually we are interested, and in the daily papers, there is its perpetual reiteration. During the last week or more, one has not been able to open the London papers without attention being arrested by the subject. Lord Avebury has been expatiating on it before the members of the London Chamber of Commerce, and emphasizing the exigent demand for something being done to coerce municipalities in the matter of expenditure, and to lighten the burden which is hanging heavily, and threatens to hang still more heavily, round the necks of the much too submissive communities. The London Chamber of Commerce were greatly sympathetic, as they always have been over this question; but really they can do nothing more than struggle in common with others in the entanglement of the universal net of municipal extravagance. As if to lend support to Lord Avebury's declamation, Poplar and West Ham (among the London boroughs) announced during the week further additions to their rates. Poplar has at length brought itself to a position of preeminence in the matter of local rates in London, with 12s. in the pound. West Ham, too, goes up; and other London authorities we hear are also contemplating further ascent. The East-end of London is the district of the poor and of the industrial class, and so forms the favourite dumping-ground for alien undesirables. The poor law and educational expenses are therefore naturally high there; and it may be taken that the weight of justification which Mr. W. G. Bradshaw felt at the last half-yearly meeting of the Commercial Gas Company in commenting upon this burden of rating will not have lessened by the time he next faces the proprietors. When considering this question of the growth of rates in London, it ought not, in order to fairly mete out justice and responsibility, to be overlooked that, in large degree, the Borough Councils are only (as Mr. Ennis put it at the Commercial meeting) collectors for other authorities. The point is made quite clear by this 12s. rate at Poplar. The Guardians, the Police, and the County Council, between them, absorb 9s. of the 12s. Some of the Local Authorities have, as the rates have become heavier, adopted the system of quarterly collections. The ruse, for it is little else, will have, in some cases where small heed is paid to local affairs, its deceptive effect; but there cannot be many ratepayers who by such artifice will be kept from a true realization of the never-ceasing enlargement of the municipal maw for revenue. A rate totalling to twelve shillings in the pound has brought the ratepayers of Poplar to a profound appreciation of their position in the matter; and a petition has gone, or is going, to the Local Government Board and the County Council embodying the grievance, and asking the withholding of fresh loans to the borough in view of the excessiveness of the amount of the rates.

The state of things in this regard is not sufficiently portentous to adopt the descriptive style of the alarmists, and call it "a crisis." The condition, however, is one which is of such seriousness that it ought to receive the earnest thought of all citizens; and it is one that foretokens evil for the future if the strong arm of Parliament is not put forth to stop the headlong rush of the local authorities into financial obligation and debt. The country is paying more now by 130 millions in rates and taxes than ten years ago; and in the decennial period the expenditure of the local authorities has increased by 68 millions. The outstanding loans of English and Welsh municipal authorities have risen in the ten years by no less than 142 millions; and now amount to over 343 millions—the total for the United Kingdom being 412 millions. It is not ignored that some of this expenditure has been for productive undertakings. But, even so, the larger the accounts of municipal authorities get, the more involved they become, and the less can one arrive at any just and true notion as to whether or not there is financial curvature anywhere—such as a neglect of proper allowance for depreciation—which tends to close to view any fair presentment of the municipal financial situation. Lord Avebury was not far wrong when he asserted that it was an easy thing for a municipality to show a profit.

His Lordship did the gas industry a service, or perhaps we should more properly say that section of it represented by gas companies, by turning public interest upon one effect of the swelling burden of rates and taxes on great industrial enterprises. We have designedly said "one" effect; for, in truth, the ramifications of the complete effects it would be impossible to trace. Lord Avebury took the Gaslight and Coke Company for illustration; and this is what he pointed out: In 1898, the rates and taxes paid by the Company amounted to £220,000, and worked out to 2·51d. per 1000 cubic feet of gas sold; by 1903, the total had risen to £289,000, and worked out to 3·29d. per 1000. Lord Avebury dropped into some slight misconception in this connection. He said that these increases in rates diminished *pro tanto* the amount of the available dividend, so that the shareholders' loss by higher rates was not confined to what they themselves paid, for to this must be added the shrinkage of their dividend. This is true so far as it applies; but what Lord Avebury evidently does not know, and what gas companies are well aware of, is that, in comparison with the consumers, the shareholders, as a body, are only affected to a comparatively moderate degree. The amount of the rates and taxes which falls upon the price of the gas possibly affects shareholders much more through the retardation of business, owing to the inflation by this means of the price of gas, than does any immediate loss that they may sustain by reason of the sum which is at the present time paid by their companies into the local exchequer. The consumers, as a matter of fact, stand to lose (through their payments for gas) in this matter of rating, in the case of sliding-scale companies, several times, according to the particular circumstances of the company, more than the shareholders; and therefore the consumers, more than the shareholders, in addition to paying rates the same as the ratepayers who are not gas consumers, are also compelled to contribute heavily to the local funds through—they are penalized, in fact, for—being gas consumers. This is another aspect of the unfair incidence of taxation. The retardation of the gas business, too, owing to the higher price charged to meet heavy rating, also affects the pockets of the consumers in another way—for the larger the business, the greater the likelihood of cheaper gas; the slower the progress, the more remote are the reductions in price. But the injury to business is not confined to the higher price charged by reason of the rates; seeing that a disagreeable consequence of high rates is the production of a greater proportion of empty houses in the district of supply. This again has a restrictive influence on business. It would be possible to go on almost *ad infinitum* showing the malign influence of this municipal prodigality and the high rates inseparable from that prodigality upon private enterprise in gas supply. The gas consumers have even to contribute directly, and again through their gas accounts, in many places, to a dissolute lavishness in public lighting through the adoption of a system which is expensive both in its installation and working costs. The tendency of municipalization is, through the resulting increased burden of rates and rate-aided competition, destructive to private enterprise, and bears particularly hard on the gas industry.

But what are the remedies? Lord Avebury proposes several. The deprivation of a voice in local affairs of large

enterprises like gas companies is a grievance and an injustice that should be remedied; but the boisterous element of the House of Commons recently frightened Sir Albert Rollit into withdrawing the Bill purposing the amendment of the law in this regard. His Lordship also urged the adoption of the proposals of the Joint Committee on Municipal Trading. But what is, in his opinion, most important, and indeed a *sine quâ non*, is also that electors should return candidates pledged to strict economy. Other people propose—as at the London County Council last week—the maintenance of a high rate of interest for local loans to act as a deterrent. But late experience is that local authorities will have money at any price; and a high rate of interest makes it so much the worse for the ratepayers. But these remedies are not enough. One Government Department attempts to lay on local authorities a restraining hand where it is apparent that wisdom does not pervade their schemes; while another Government Department does its utmost to make easy the way of thriftlessness. And, at the same time, certain Parliamentary Committees decline to allow the largest of ratepayers to be heard on doubtful municipal measures. All the proposals of Lord Avebury, while they may contribute to the end, will not alone compass it. Parliament must step in, and new laws be applied to local government; for it is clear the present laws have not conduced to economic administration. Many Unionist Members of Parliament have developed a new concern in this matter; and there is to be a combined representation on their part to the Government in regard to it. The inceptive steps are to be taken by the Hon. W. F. D. Smith, the Chairman of the London Unionists.

The Despoiling of Non-Statutory Companies.

NON-STATUTORY gas companies throughout the United Kingdom will receive the intelligence with pleasure that at length there has been found a Committee of the House of Commons who have declined to be bound by custom, and have recognized that custom should always be subject to circumstances. For something like a quarter of a century, it has been the practice of Parliamentary Committees, when non-statutory gas companies have made application for statutory powers, to inflict upon them, if the local authority so requested, a purchase clause, permitting the latter to obtain, without opposition, power from Parliament to dispossess the company of their property. This custom has survived so long that local authorities have mistakenly regarded it as a prescriptive right, overlooking the fact that if, for the mere asking, they had a title to such a clause, then the action of Parliament in putting the whole of its machinery into motion for the purpose of granting in the end what was a right in the beginning was simply a perfect farce. Before such a permissive purchase clause can be obtained in the case of a non-statutory company, the entire procedure to which an opposed Bill (say) of a statutory company has to submit has, in precisely like manner, to be passed through; and consequently the inquiry by Select Committees in such cases would be absolutely devoid of purpose or sense if, in the result, they had to confess that they were tied by custom, and had no liberty to determine the matter on the merits of the case. The whole contest would be ridiculous. That is the simple and complete answer to learned Counsel, and even to the, in most things legal concerning gas and water, infallible "Michael and Will," when the custom is argued and relied upon.

To the Hitchin and District Gas Company and those associated with their Bill in Parliament this year will stand recorded the honour of having been the first to shatter this fallacy of years—at all events before one Parliamentary Committee; and gas companies, both statutory and non-statutory, throughout the country will heartily hope that the blow to municipal arrogance and expropriation will be repeated in the Lords, to which House the District Council have announced, through their Counsel, their intention of following the Company. Uncommon interest attaches to the story of the fight waged over the matter before Mr. Agg-Gardner's Committee; and, as told in the report, those who took a principal part in what we hope is the beginning of the destruction of a destructive and really defenceless custom where a non-statutory company has a good administrative record, were Mr. Balfour Browne, K.C., and Mr. A. M. Paddon, with Mr. Arthur F. Phillips, Mr. Corbet Woodall, Mr. William Hill, and Mr. W. R. Phillips—the two last-named being respectively Chairman and Manager of the Company. It is only a sound proposition that, when a local authority are petitioning for a purchase clause, its grant should depend upon the character possessed by the company. In this case, the Hitchin Company were in a position to prove to the Select Committee that they had—we will not commit ourselves so far as to say a unique character, but we will assert an extraordinarily good one, and that therefore it would be most unjust to compel the handing over of their concern at any price to the Local Authority. There has been no complaint whatsoever against the Company; but, at the twelfth hour, the District Council tried the effect of advancing the extremely, in the circumstances, unreasonable case that the Company had put themselves into a strong financial position at the expense of the gas consumers. Such a case must fall before hard facts. For thirty years the Company have not, as they might have done, raised any share capital; and the total share capital on which 10 per cent. has been paid is only £7000. The whole of the money required for the increase of business during that long period has been borrowed at 3½ and 4 per cent.; and the difference between the dividend they might have received on the issue of share capital and the interest they have had to pay on the debentures has been appropriated in the building up of a valuable property. The result has been that, for a town of this size and character, both the Local Authority and the consumers have been exceedingly well served. The economical management of the past permits gas to be sold at present to the ordinary consumers at 3s., and to the Council for public purposes at 2s. 5d.; and what has been done in the past assures advantage to consumers in the future. It would be a poor requital for good service that the Company should be made unwilling sellers of an undertaking which they have, by their frugal administration and self-denial in the matter of profits, put into such a strong position—more during past years to the behoof of the consumers and town than of themselves; for it follows that if they had worked on share capital instead of cheap borrowed money, things would not be as they are now.

All this has been the work of the Company and not of the Local Authority; but it is the latter who, now that the concern has been established in an enviable position among companies of like condition, seek to despoil those who have accomplished so much. We hope that in the Upper House meritorious service will again be successful over a custom that has been far too much honoured in the Committee-rooms, and the observance of which has not always been supported by justice. If the issue be the one we hope for, it will be an encouragement to other non-statutory companies to do the best possible for their consumers; and, moreover, it will be a signal triumph for private enterprise over municipalization. It is something gained to have a Committee of the House of Commons declaring in effect that, in this matter, they have free will, and are not fettered by the decisions—given rightly or wrongly on the merits of the cases—of Parliamentary Committees in past years.

"Success" as Seen by the Parliamentary Committee of the L.C.C.

To be a member of the Parliamentary Committee of the London County Council, it is necessary to be accomplished in the art of blandishment, and to be subtle and inventive. Otherwise a member cannot possibly successfully fulfil the requirements of the office. As well as being strongly progressive, with numerous shades of opinion in its composition, and a very decided partiality for spending money, and producing fine crops of rate accretion, the Council are also acutely critical; and there is always sorrow and reproach in store for the Parliamentary Committee, if, after the Council have ordained a thing, they return from an encounter at St. Stephen's with a tale of failure, unless the special qualifications mentioned in the opening sentences are sufficiently powerful to carry the members through. The office of Chairman of the Committee is not one to be coveted; for in the Council Chamber he has to bear the brunt of the criticism of the defeats which follow in quick succession in submitting the Council's quixotic promotions to, or in taking the part of opponents in, Parliament. The present session has simply reflected the Council's want of luck in previous ones. The Council introduced a Sale of Bread Bill this session. Parliament has rejected it. The Port of

London Bill is being pushed by them for all it is worth against an intractable opposition. The Government has joined the latter. The Buildings Acts Amendment Bill has been so emasculated, through the pressure brought to bear upon the Council, that the title now calumniates the contents—the only connection between buildings and the Bill being the fire clauses, which are about all that remain of the original measure.

There is not much for mirth on their part about this defacement of the Council's parliamentary programme; and so the Parliamentary Committee, by the exercise of a little of their blandishment, subtlety, and inventiveness, framed, after the contest before Mr. Cawley's Committee, a report on the London Gas Bills, through which ran the note of victory, and was doubtless intended to bring the Council back to a state of sweetness after the miserable confessions as to the parliamentary programme for the session dropping to pieces through the Council standing absolutely friendless at the bar not only of Parliament but of public opinion. Now what has the Council got to be cock-a-hoop over in connection with the London Gas Bills? They have gained absolutely nothing that is worth having that the Departmental Committee of the Board of Trade did not recommend; but, on the other hand, the Council have been completely defeated on those points which departed from the Committee's report, and which disclosed the rabid vindictiveness of the Council towards the Gas Companies. The Council sought to reduce the standard price by a penny; and to merely suspend forfeitures in respect of sulphur impurity. The proposal as to reducing the standard price appears to have been a little arrangement between the Parliamentary Committee and the Public Control Committee; and the latter are angry because the former were compelled, by the weakness of their case, to withdraw the pretty little intention to do an injury to the Companies. The singular and despotic ideals of the Council are not countenanced by Parliament. The two proposals referred to were opposed to the recommendations of the Departmental Committee. Notwithstanding, because in Parliament one of them was refused and the other withdrawn, members of the Council rage. The Gas Companies have proved that one of the recommendations of the Departmental Committee is not just, nor in the best interests of the public or the gas industry; and the House of Commons Committee (while not relieving the Companies of the injustice), showed their sense of it by relaxing its operation. All the time the Companies were engaged in proving this to the Commons Committee, the representatives of the County Council were croaking against any departure (though they had sought to amend the recommendations in the manner already mentioned) being made in this respect from the report of the Departmental Committee. In everything, the Council are of opinion they should be absolute; but other people fortunately have different views. The Companies, in the result, have far more reason for rejoicing over the failure of the Council in their distinct departures from the report of the Departmental Committee, and over the recognition by Mr. Cawley's Committee of the hardship of the gas-testing clause, than have the County Council in simply being the means of getting Parliament to endorse recommendations made by another body.

The Parliamentary Committee also reported to the Council that the preamble of their own Bill had been passed by the Commons Committee, and that of the Joint Gas Companies rejected. It is one of the arts of drafting reports to put a good complexion on things. The Bill of the Council has been considerably modified since its introduction; but, of course, there was no need to describe what had happened with too much exactness. And what the Committee term the rejection of the Joint Companies' Bill was purely a formality, after the County Council Bill had been dealt with in a manner to make it coincide with the views of Mr. Cawley's Committee. The withdrawal of the 13-candle power gas clause from the South Suburban Bill, we claim, was not an effect of the opposition of the Council, although they seem to infer that it was. It was purely a question with Sir George Livesey and his co-Directors of refusing to have imposed upon them a test wrong in principle, and the absurdity of which was shown by the County Council's own chief witness, as well as by those who were examined on behalf of the Company. "The Council," remarked the Committee in their report, "will no doubt regard the result as very "satisfactory." The Council are not in agreement on the point of satisfaction; and if they were, we might have been pardoned for thinking their satisfaction had wholly been derived by looking at the reflection in a distorting mirror of the Council's "success" in getting only what the Departmental Committee advised, with, against the will of the Council, a little of the rigidity removed from the illuminating power test.

Premiums for Officials.

The attention of those gas administrators who are contemplating the introduction of some form of profit-sharing among their official staffs—and also, it may be added, that of those who have not yet taken into consideration the wisdom of adopting this means of increasing the efficiency of the working—may be directed to the details which we are enabled, by the courtesy of the Secretary (Mr. Charles H. Armstrong), to publish to-day of a scheme which has lately been started by the Walker and Wallsend Union Gas Company. This step has, it may be remarked, been taken by the Board of the Company because they have become convinced that some system of reward should be given to the staff for any extra or special exertions as the result of which the business would be benefited. At first sight, perhaps, the arrangement outlined may appear a little complicated; but in reality it is not so. The reason for drawing up the scheme in the form in which it is shown was that the Directors thought the payment of direct bonuses, irrespective of whether or not the beneficiaries had done anything special to earn them, would not be desirable. They therefore decided not to put the whole of the staff under the same conditions, but to apportion the benefits in such a way as to furnish a particular incentive to zeal in the discharge of his duties on the part of each individual employed. It must be pointed out that the two chief officials of the Company—namely, the Secretary and the Manager—have no participation in the division. As was explained at the last meeting of the Company, it is possible by the scheme for all to earn up to about 5 per cent. upon their respective salaries; and the result has been exceedingly satisfactory, the maximum amount having been secured by the men. It will be noticed that one feature of the arrangement is the transfer of one-half of the bonus to a fidelity and guarantee insurance account. First of all, half the sum earned, to which he is entitled under the scheme, is paid direct to each man; and from the other half any necessary sum is taken to keep the fidelity fund at a level of £300 (to which figure the Board themselves made it up in the first instance). The remainder is then pooled, and all share in its ultimate distribution in proportion to their salaries. The working of this profit-sharing and premium system has proved satisfactory to the Walker and Wallsend Gas Company; and there is no reason why other similar undertakings should not derive like benefits from the adoption of a scheme drawn up on the same lines.

The London Electrical Bills.

Their Lordships sitting in judgment on the London Electricity Bills continued the inquiry throughout last week. Part of the first day's work was conducted under illumination afforded by flat-flame gas-burners, which the Grand Committee Room still contains, for what reason perhaps no one can tell. Points of interest about the Bills were noticed in our leader columns last week, and in the "Electric Lighting Memoranda" in the same issue and on previous occasions. We understand that the position had not changed at the end of the week in respect of the promoters' proposals to compulsorily acquire land which both the Gaslight and Coke Company and the South Metropolitan Company have and require for gas-works purposes. The latter Company have especially, as indicated in last week's issue, a great cause of grievance. However, during Monday the case for the Administrative County of London Company's Bill closed; the witnesses during the morning having made clear to the Committee their proposals for laying a ring main and cables under the streets of London, and for paying considerably more attention to the industrial section of the Metropolis than to the non-industrial. It seems pretty evident the Company's proposals are not of such a self-sacrificing and philanthropic order as they would have the Committee believe. They scornfully refer to the patchy character of electricity supply in London; in their own case, there is, it would seem,

to be a little picking of the fat from the lean when, if ever, they are allowed to disturb London with their cables. The nine existing Electricity Companies were first heard in opposition. The statement of the fact is suggestive of the character of the evidence very properly laid by them before the Committee. The large amount of capital expended on the faith of parliamentary enactment, the hardship under the circumstances of competition, the energy displayed in the conduct of their business, and their capacity for meeting all requirements were of the points. It was hinted that one of the objects of the Administrative County Company was, by means of cheap supply, to cause the abandonment by the present owners of their generating-stations, and then "good-bye" to electricity for power purposes at 0·75d. The opposing Companies had no lack of influential support. The Borough Councils were also heard; and on Friday afternoon the Committee were still gravely listening—but, by that time, to the case for the London County Council.

The Streets and the Schemes.

This big rush of conflicting electrical schemes for London this session has no doubt been produced by several causes; but probably one of them is the struggle to get rights in the streets before the Traffic Commission report. There is no question that the Government ought to absolutely refuse to grant new powers for breaking up the streets until the Commission have reported. The value of the report will much depend upon it dealing with a state of affairs actually in existence, and that would not be so if the condition is to be made worse. Lord Stanley has, in the House, announced the disfavour with which he regards the Metropolitan Pneumatic Company's despatch scheme, which the Gaslight and Coke Company are, among many others, opposing. His Lordship is strongly of opinion that no such measure should be proceeded with until the Traffic Commission has reported; and in this he is in agreement with the Corporation and the County Council. If the Pneumatic Despatch Company are to be stopped, why not the new Electrical Companies? There is no violent hurry for the one or the other, if there is any need at all for them. The proposed main cable ring in the Administrative County of London Company's scheme will be only a partial relief—not from existing congestion of underground London, but from what would happen if they carried their scheme out on other lines. At the same time, from the ring must be carried distributing cables; so that the relief sounds better in evidence than it would be actually. The streets are already overcrowded; and it is a matter of great difficulty for the present occupants to negotiate the awkward conditions met with. Some one has asked what will happen in the event of a fault in the proposed ring cable? We will leave the matter at the question.

Hints on Promoting New Business.

The American is generally regarded on this side the Atlantic as being specially gifted in the art of pushing business—an accomplishment in which, until recent years, the Britisher was singularly deficient. As a general rule, the attitude assumed by the proprietor of a trading concern in this country was one of placidity. He stood behind his counter or sat in his counting-house and quietly waited, like Mr. Micawber, for something (or somebody) to "turn up" and do business with him. A quarter of a century ago, the gas manager was no exception to the general rule. He was prepared to furnish a supply of gas if requested to do so, and under adequate guarantees, but he did not go outside his office to "solicit orders." Such a proceeding would, indeed, have been regarded as unusual, not to say *infra dig*. Fixing a few electric lights on the parapet of the Thames Embankment towards the close of 1878, however, had the effect of rousing him from his lethargy; and from that time till the present he has seen that it is to his own and to his employers' advantage to push business. It may be said that the culmination of the united efforts in this direction of all connected with the gas industry was witnessed at Earl's Court exactly twenty-six years after the Thames Embankment flutter. The stimulating effect of the recent great display is not likely soon to die out—indeed, the "business" habit has "come to stay" with middle-aged gas managers, while the younger ones have acquired it as part of their professional training. We are led to these remarks by noticing that the commercial side of the gas business was to the front at the meeting of the Scottish Juniors last Saturday, and also at the recent annual meeting of the Wisconsin Gas Association, as our readers will see by the papers which appear elsewhere, two of which show that even the smart men over the water do not mind receiving a few hints that may prove useful to them. Mr. D. Douglas, the President and Manager of the Eau Claire Gas Company, dealt rather with the disposal of the residual products to the best advantage, and so benefiting the undertaking financially, than with increasing the bulk of business. Mr. G. Williams, who is the salesman for the Madison Gas and Electric Company, on the other hand, addressed himself specially to the latter point, and told the members how he thought they ought to set about achieving this object. A primary condition is a united staff, all working in the direction of promoting the welfare of the concern in which they are engaged; and an equally important one is the goodwill of the public. He emphasized the point that a gas company, working by methods which are common to any mercantile business, must assume that they want all the custom they can possibly get, and, moreover, must "reach out for it." The contented company will, he said, sooner or later—possibly sooner—"become stagnated;" and everyone knows that stagnation leads to decay, and decay to annihilation. This will never be the condition of the gas industry so long as the present spirit animates those who are engaged in it. Of course, there is nothing new in all this. But, as in the case of some other old truths, it is beneficial at times, as some of us are reminded on Sundays, to have our attention once more directed to them.

The Practice of Economy.

With the present-day upward tendency of the rates we are, unfortunately, all acquainted; and most people are more than a little alarmed at the seeming inability of the local governing bodies to stem the rapid growth of this demand upon their pockets. That the need for retrenchment has been recognized, in certain quarters at least, has been obvious from the utterances of some of the Mayors and Chairmen of Finance Committees during the past year or two; and it may not be too much to hope that time will bring with it some good results therefrom. Large numbers of councillors, however, appear to possess somewhat hazy ideas as to the soundest methods of practising economy, with the result that a vast amount of energy is frequently expended in an endeavour to upset the recommendation of a Committee that an official under them should be awarded an increase of salary. A few weeks ago we ventured the opinion that the long and personal discussions of this kind that so frequently take place are one of the most unattractive features of corporation employment; and that this view is shared by others is shown by a discussion which occurred last month in the Birmingham City Council. There was a lengthy debate of much about the usual character, with regard to a proposed increase in the salary of the Secretary of the Water Department consequent upon an extension of his responsibilities; and, at its conclusion, Alderman Sir Hallewell Rogers took occasion to remark that a discussion of this kind was likely to do a great deal of harm, because they would not be able to retain the best possible officers if they were to be talked about in the way some members had spoken. This led to a protest on the part of one of the members who had opposed the increase, against any objection being taken to "criticism." The Chairman of the Water Committee (Alderman Lawley Parker), however, said he happened to know that "in one instance at least the idea of being gibbeted in the Council, and made subject to remarks such as had been passed with reference to another official had such an effect upon a very good man who would otherwise have come into the service of the Council that they were not able to obtain his services." As to which it may be remarked that possibly other places besides Birmingham have suffered, or will suffer, from a like cause.

Other Examples.

But it must not be taken for granted that the payment of officials is the only direction in which the advocates of economy are actively interesting themselves; for during the past few weeks other instances—not by any means new, either—have been noticed. A member of the Stalybridge, Hyde, &c., Tramways Board has been displaying wondrous judgment by objecting to the expenditure of forty pounds by a deputation who visited Glasgow

in connection with the work of the Tramways Department, which is perhaps on a par with the attitude taken up in one or two quarters with reference to visits to the Earl's Court Exhibition. The knowledge which can only be gained by personal observation is absolutely necessary to those who are called upon to administer the various huge commercial enterprises that municipal bodies now consider it part of their duty to control; and to object to the comparatively trivial outlay thereby incurred is little short of folly. No doubt this deputation will be able to save its cost to the Board many times over; and it is easy to believe, as asserted by one member, that they might have saved thousands of pounds if they had had more deputations in the past. A further example of an unwise attempt at economy has been furnished in the same neighbourhood—at Dukinfield, where exception was taken to a proposal that the Mayor and Town Clerk should represent the Council at last Saturday's meeting of the Association of Municipal Corporations. The outlay involved in this case was the staggering amount of twelve pounds; and the objectors showed a truly marvellous want of appreciation of the merits of the question they were discussing. The Association would find their power for safeguarding the interests of municipal bodies rapidly reduced to vanishing point if the authorities themselves refused to countenance their efforts by allowing their representatives to attend the meetings. Fortunately the effort to save the ratepayers the few pounds in question was unsuccessful; but it is not the less to be regretted that it should have been made. Real economy is needed badly enough; but surely some better directions can be found in which to make a start than the "penny wise and pound foolish" methods here enumerated.

WATER AFFAIRS.

Reorganization at the Water Board.

THE important public service which was for so many years controlled by the London Water Companies has been for nine months in the hands of the Metropolitan Water Board, and a certain section of the public have already been looking for some of the good results which they were led to believe would accrue from the change. The transfer of the management from eight Boards of Directors to one single body of representatives, working whole-heartedly in the interests of the community at large, would, it was thought, lead to greater uniformity of administration; while the concentration of the engineering staff under one chief would ensure more efficiency and economy in a department where the latter could well be effected without detriment to the former. It was anticipated that the outcome of these reforms would be reductions in the charges for water, or large profits applicable for other purposes, coupled with a geniality of feeling between suppliers and supplied such as had never previously existed. Unfortunately, this happy state of things has not yet arrived. Indeed, there have been murmurs of discontent at the new body. Consumers in the West have protested against being deprived of the rebate which they had for some years been allowed by the "grasping" predecessors of the Board; while in the City, as our columns recently showed, the new body are not favourably regarded either for their moderate charges or their method of levying them. In other parts of the area of supply it has been found that the Board are quite as insistent as were the Companies in enforcing their regulations for the prevention of waste, and equally prompt in cutting off a supply where this is found to be necessary. In regard to the former matter, it has been said that the "little finger" of the Board is thicker than the "loins" of the Companies. Probably much of all this complaining is due to impatience and inconsiderateness. People are too prone to look for results before there has been time for their achievement. But, whether in the individual or in a public body, reforms cannot be effected at a stroke; and all that one can do is to exercise patience, and welcome any indication of them which presents itself.

This was afforded at the meeting of the Board on Friday, when an important report on the reorganization of the Chief Engineer's Department, the main features of which will be found elsewhere, was presented by the Works and Stores Committee. It embodies the results of a long inquiry by a Sub-Committee, and it shows clearly, as do various other matters which came before the members, that the past nine months have been by no means a time of idleness. Before dealing with the constitution and duties of the engineering staff, the Committee describe the steps they took with the view of making the several districts more uniform in area. Under the Companies, they varied from 39,871 supplies in Chelsea to 231,154 in the East End; and the two small areas of Tottenham and Enfield have since been added—the total number of supplies being now 1,021,854. Under the new arrangement, details of which are given in the report, there will be only five districts, four of which will each have rather more than 200,000 supplies, and Kent will retain its 111,669. This seems to be a distinctly better division of the entire area, especially as it makes one district of the three western and another of the two southern districts. The latter has been placed under the control of Mr. J. W. Restler, who is appointed Deputy Chief Engineer of the Board. Mr. Restler was the Engineer of the Southwark and Vauxhall Water Company; and consequently he will be quite at home in the district which has been assigned to him. Mr. Ernest Collins, Mr. W. Blackburn, and Mr. H. F. Rutter are to be the Engineers for the New River, eastern, and western districts respectively. It is unnecessary to go into the details of the Committee's scheme. It is sufficient to say that certain existing offices are abolished, and that a saving of about £1500 a year is expected from its adoption. The area of the Board having been more equally divided, facility will be afforded for adopting a uniform scale of charges; and it is proposed to seek the sanction of Parliament for this next session.

The purchase of the water undertakings has been a costly business, as people who were most competent to judge predicted it would be. But the Board appear to be making all their arrangements with the view of ensuring the utmost efficiency in every department. If the salaries of the chief officials appear to some to be a little too liberal, it must be borne in mind that in the control of the water supply of such a place as the Metropolis the highest ability must be secured. Those who were most familiar with the operations of the various Companies were unquestionably the best people for the Board to retain as their responsible officers; and their retention necessarily involved the offer of salaries which would be adequate remuneration for the services rendered. In a short time the first report of the Board will be available, and then people who are sufficiently interested in the matter will be able to see how the latest important addition to the public bodies of London stands, financially and generally.

Eastern Counties Association.

The members of this Association will hold their next meeting on the 13th inst. at Leighton Buzzard, under the presidency of Mr. J. Stewart Dougall, of Boston. They may depend upon a very hearty reception from the Chairman and Directors of the Leighton Buzzard Gas Company, and their Engineer and Manager, Mr. C. F. Ruggles. The *rendezvous* is the gas-works; and there the members are invited by the Directors to a light luncheon. There will subsequently be a drive, which will end at the place of meeting. In addition to the usual business transacted at this meeting, three new members will be elected, and two papers will be read. One is by Mr. R. G. Shadbolt, of Grantham, on "The Commercial Aspect of Technical Societies;" and the other, by Mr. W. D. Child, of Romford, on "Gasholders and Tanks: Notes and Queries." After the meeting, the members will be conveyed to the Swan Hotel, where dinner will be served.

Presentation to Mr. Samuel Milne.

Mr. Samuel Milne, the Manager of the Aberdeen Corporation Gas-Works, was last Thursday made the recipient of several gifts from the workmen in the Gas Department; the occasion being his approaching marriage. The presentations took place within the works, at a gathering of the subscribers, presided over by Mr. W. Hadden, the foreman of the street department, who remarked that their presence indicated their feelings towards Mr. Milne. The gifts consisted of a marble clock with side ornaments, and a barometer. Mr. Milne having accepted them, said that ever since he had been connected with the works, and particularly since he was appointed Manager, he had received nothing but courtesy and respect from the men; and this crowning act of theirs he appreciated very highly. He thanked them, not only for the handsome presents, but for their good wishes for himself and for the lady who was to be his partner. Mr. John Paterson, the cashier, also spoke in appreciative terms of the esteem in which Mr. Milne was held by the men. The clock bore a suitable inscription.

THE FIVE CUBIC FEET RATE OF TESTING LOW-ILLUMINATING POWER GAS.

LETTERS FROM SIR GEORGE LIVESEY AND THE PRESIDENT OF THE INSTITUTION.

The anomalous and objectionable position into which the gas industry has been thrown in the matter of testing gas of low illuminating power by the ridiculous recommendation of the Departmental Committee can only be broken through by very resolute action on the part of the industry. It is a matter which must not on any account be allowed to rest. In last week's number, the momentous character of the issue facing the industry and the gravity of the position were urged; and we bespoke for those who have so far waged war in this matter the united support of the British gas industry as well as of the Institution of Gas Engineers, who have already taken part in the struggle. We are glad, therefore, to give special prominence to the letters on the subject from Sir George Livesey and Mr. D. Irving, the President of the Institution. It will be seen from Sir George's letter that he is too old a campaigner to allow this defeat to dishearten him; and the cheery tone of his letter shows that he will, with an industry united in purpose, go forward until this result of obstruction and prejudice is completely destroyed. "The Japs," writes Sir George, "had several checks and repulses; but they took Port Arthur, notwithstanding; *and it will be the fault of the gas industry if they fail to achieve a similarly satisfactory result.*"

It is extremely gratifying to be able to publish the letter from the President of the Institution in conjunction with that of Sir George. The companionship is indicative of strength in a common cause. It may not be generally known that Mr. Irving was in London on the day when the memorial of the Institution to the Board of Trade on the subject was read to the House of Commons Committee, in order to speak of the unanimous manner in which the members condemned, at the last annual meeting, the injustice which it was proposed to perpetrate and to perpetuate; and we believe that, in his individual capacity, he was prepared to have gone further in support of the proposals of the South Suburban Gas Company's Bill. Unfortunately, the Committee at the time had so far made up their minds to follow the recommendation of the Departmental Committee, that they preferred not to have further evidence; and therefore the President was not heard. The Institution will not be satisfied with the little attention that has so far been accorded to their protest. In their reply to the memorial, the Board of Trade said they would "not fail to bear in mind" the views expressed by the Council in the present session. That they have not borne them in mind is evident from the position to-day. From his letter it will be seen the President is going to further submit the matter to the Council and members of the Institution.

The following are the letters from Sir George Livesey and the President:—

A Call for General and Energetic Action.

Sir,—Your notice in this week's "Journal" of the adoption by a House of Commons Committee of the uniform 5 feet rate of burning gas for testing all qualities in the "London" standard burner is a call-to-arms to the gas industry, to show that such a false method of testing gas is impossible. I use the word "impossible" because it is not possible to test gas of varying illuminating power and varying composition in this way, if the test is to have any meaning or value.

The gas industry has a right to demand that gas shall be tested in the best way—that is, to give the most light, provided it can be so used by the consumer. This, of course, applies only to luminous flames which are fast becoming obsolete. With the advent of incandescent mantles—which, for practical purposes, dates back only three years in this country, when freedom to purchase them was obtained—testing the luminosity of gas became a farce, and a serious obstacle to the development of the gas industry. This is really the serious part of the unaccountable recommendation of the Departmental Committee as to testing. We want more freedom to meet the competition of rival methods of lighting, heating, and power; but increased restriction is put upon us.

The first effect of the decision of the Commons Committee on this point, which was only to govern the three London Companies, was the withdrawal of the clause for the reduction of illuminating power in the South Suburban Bill. The attempted imposition of this false method of testing, therefore, stops for a year the efforts of the Company to abolish useless enrichment, and to reduce the cost of gas by getting all that is possible out of the coal. The Parliamentary Committee of the London County Council say: "The Council will no doubt regard this result as very satisfactory;" but the result to the consumers will be an increase of 1d. per 1000 feet, instead of a reduction of 1d., or about £11,000 a year out of their pockets, with no benefit either to them or to the Company. For this they may thank the London County Council, who have been the moving spirit in this matter since the right method of testing was authorized by the South Metropolitan Act of 1900. The South Suburban is not one of the Metropolitan Companies. Therefore, if they had accepted this unjust method of testing, it would have formed a precedent for its extension to the Provinces.

However, it is only a check in the forward movement of the gas industry. It will not be stopped by the ignorance and prejudice of such a body as the London County Council. The Japs had several checks and repulses, but they took Port Arthur, notwithstanding; and it will be the fault of the gas industry if they fail to achieve a similarly satisfactory result.

Fortunately, the more the question is investigated, the more is the injustice and the weakness of this system of testing shown. The London engineers will not fail their brethren in the Provinces in this matter, which affects all suppliers of gas. The obnoxious clause will be contested in the Lords, not without hope of success; and if they pass it, "the resources of civilization," or of something else, will not be exhausted.

Happily, the representatives of the gas industry are united as they have not been before, and, with united action, there can be no doubt of success.

George Livesey.

March 31, 1905.

The Institution and Further Action.

Sir,—Several suggestions have been made to me that the Institution of Gas Engineers should follow up their recent action in memorializing the Board of Trade in reference to the very unjust method of testing gas for illuminating power recommended in the report of the Departmental Committee.

How any Committee could ever have made such a recommendation is beyond the comprehension of all who have any practical knowledge or experience in gas testing. The idea that there was to be one standard burner for all qualities of gas, and that the illuminating power was to be fairly determined, or indicated, by burning 5 cubic feet per hour, is most absurd.

The evidence given before, and the decision of, Mr. Cawley's Committee last week on the Bills promoted by the London Gas Companies furnish additional reasons why the Institution and all who have any interest in justice and the gas industry should bestir themselves. There can be no doubt that though the present unfair methods of testing apply only to the Metropolis, sooner or later they will be applied to every gas undertaking in the country.

The subject will, as a matter of course, be considered by the Council at their next meeting, which is to be held in Bristol early in April; an important paper is also to be read by Mr. C. Carpenter, of London, upon the subject of the Departmental Committee's report, at the annual meeting of the Institution in London; and every opportunity will be afforded the members to thoroughly discuss, and, if thought desirable, resolve upon, some further course of united action.

Bristol, March 31, 1905. D. Irving.

Austro-Hungarian Gas and Oil Industries.

In the "Journal" for Feb. 9 last year (p. 342), we drew attention to the useful little annual compiled by Herr Hanel with the object of displaying at a glance the growth and present position of gas, oil, and certain other industrial undertakings operating in Austria-Hungary. This year's issue, which has a slightly different title—"Jahrbuch der Chemischen Industrie"—is equally instructive, and has attained large dimensions, mainly owing to the inclusion of data relating to similar industrial undertakings in other lands. The statistics of the world's production of mineral oil show the relatively large growth in recent years of the output of the Galician oilfields. The last three years for which figures are available have shown progressive decreases in the American and Caucasian outputs; but the Galician production has rapidly increased. In 1903, Galacia was responsible for 1-32nd part of the world's production of mineral oil, and a considerable proportion of its output was exported. The development of the Galician oil industry should be watched with interest by managers of gas undertakings possessing carburetted water-gas plant. The particulars of the gas companies operating in Austria-Hungary, referred to in the notice of Herr Hanel's compilation for last year, have been brought up to date and somewhat extended. Of these companies, readers of the "Journal" will be most interested in the Imperial Continental Gas Association, which in Austria has gas-works at Vienna, Brüx, Graslitz, Komotau, Lieben-Prague, and Saaz, and electricity works at Komotau, and for the lighting of two theatres only in Vienna. The book is published by Alfred Hölder, of Vienna.

NOTES FROM WESTMINSTER.

[For Parliamentary Intelligence, see p. 38.]

THERE is a long-standing joke which likens our Legislative Houses to gas-works; but it is so well-stricken in years that its repetition barely now draws a smile. We do not object to the simile, even when one of our electrical contemporaries in these latter days trots it out as something new in the humourous line. The joke came to mind last week, when searching in the Committee rooms for discussion of the particular brand of gaseous production in which we have especial interest. The week only claimed one contested Bill in which coal-gas works had part, and that was the Bill introduced by the Hitchin and District Gas Company; and for consideration of that Bill the parties had been waiting for some days before it came on—the Sale of Bread Bill of the London County Council and the Acton Sewage Bill (the incongruity of subject is rather striking) having blocked the way. But Tuesday morning saw the Hitchin Bill before Mr. Agg-Gardner's Committee. Although the promoting Company is a comparatively small one, its size is no measure of the exceedingly interesting character of the proceedings, for in connection with it has been won from the Committee one of the most welcome decisions in respect of a non-statutory Company that has been secured for the past quarter of a century. Counsel for the Bill were Mr. Balfour Browne, K.C., Mr. Claude Baggallay, K.C., and Mr. Paddon. But the bulk of the work fell upon Mr. Paddon; and his conduct of the case was marked by an ability which it is a pleasure to recognize. His opening speech was a model of conciseness and clearness; and it put the Committee at once into possession of the complete facts of the case for the Bill. The Hitchin District Council were the only opponents, and for them Lord Robert Cecil, K.C., and Mr. C. C. Hutchinson appeared. The principal witnesses for the Bill, giving the names in the order in which they were called, were Mr. William Hill (the Chairman of the Company), Mr. W. R. Phillips (the Engineer and Manager), Mr. A. F. Phillips, and Mr. Corbet Woodall. The opposition, while it was asserted that it was directed against the preamble of the Bill, was, so far as one is able to judge from the cross-examination of the promoters' witnesses, of a forced rather than of a substantial character; but it is only fair to say that the evidence of the experts Mr. H. E. Jones and Mr. Charles Hunt was not laid before the Committee, so that it is impossible to say what strengthening influence this would have had had it been produced. But the principal object of the Council was to secure a purchase clause—a common enough grant by Parliament to local authorities in the case of non-statutory companies. But it has not been allowed in this case, though the appeal which the District Council are evidently going to make to the Upper House may—it is hoped that the event will prove otherwise—alter the verdict. What the views of Mr. Jones and Mr. Hunt were on this question of the purchase clause in this particular case, did not transpire; but whatever they are, if favourable on any other ground than custom, that ground in this particular case must be, we think, in the eyes of two such progressive gas engineers, of rather an insecure character. Over the Bill, prior to its appearance before the Committee, there had been a considerable amount of discussion; and those concerned in it are no doubt heartily glad, in view of the attitude of the District Council, to have all the discussion finally determined by Parliament. The success of the Company in resisting in the Commons the application of the purchase clause has naturally given much delight to the Chairman and Directors and their Engineer, together with Mr. Phillips and Mr. Woodall, both of whom have entered most thoroughly into the struggle in this case to break down an irksome practice which has indubitably retarded non-statutory companies in approaching Parliament in the interests of both the locality they serve and themselves.

Non-Statutory Companies and a Purchase Clause.

The Case and the Arguments.

It was seen, from the opening of Mr. Paddon and the evidence, that the history of the Hitchin Company has been in most respects of the normal character; but the methods they have adopted have been of a more enlightened order than is often found in the case of a company untrammelled by parliamentary restrictions. Their policy has been to put the undertaking in a remarkably strong financial position; and the consumers to-day are reaping the advantage. It is true that in some directions the Company's policy would not have been permissible under statutory rule; but that they have been discreet in their liberty requires no better evidence than that shown by their standing to-day. The share capital of the Company is only £7000, bearing a 10 per cent. dividend; and £14,000 is borrowed money, £8000 of which carries 3½ per cent., and £6000 4 per cent. interest. That two-thirds of the money used in the business requires less than 4 per cent., that the holders of the small amount of original capital have been content with 10 per cent. dividend, instead of taking advantage of their unfettered position, and have devoted divisible profits to capital requirements, is accountable for the Company's enviable condition. The capital expenditure averages only £420 per million cubic feet of gas sold; and, as remarked, on two-thirds a low rate of interest is paid. Few, if any, companies equal in size have done better in securing a perpetually reasonably cheap supply of gas for a community of the character of that of Hitchin and the district. They are now supplying the ordinary consumers at 3s.; and the Local Authority at 2s. 5d They came to Parliament with a clean sheet, and free from complaint. It was a difficult case for the opponents to deal with in asking for a purchase clause; and they continually fell back on the old cry of parliamentary custom. The Company asked for statutory protection and ordinary powers; consolidation of the share capital on a 5 per cent. basis; the sliding-scale; £36,000 of new capital; and the usual borrowing powers. The opposition complained that the Company in their financial dealings had not properly considered the interests of the district. This is an opinion that is not supported by living facts. On behalf of the Council, it was also argued that the consumption was not likely to increase at the same rate in the future as in the past, which is a contention incompatible with their anxiety to gain possession of the undertaking. The Company and their advisers, with their experience, have different views as to the future; and hence the value they set upon the retention of the property. The Council, previous to coming to Parliament, offered £33,250 for the undertaking, which, after paying off the borrowed money, would leave £19,250 for the ordinary shareholders. The Company prefer not to part at this price. The Council, in asking for a purchase clause, desired a stipulation that there should be no allowance for compulsory purchase. It is evident that they are very anxious to get hold of the concern, even though they possess electric lighting powers which they have not themselves put into operation; and they fought hard before the Committee to get a clause which should have the effect of forcing the Company into submission. The Company, as Mr. Balfour Browne put it, rested their case for remaining in undisturbed possession upon the merits of their conduct of the business in the past. The testimony of the witnesses already named, and the evidence, too, that there was no demand on the part of the ratepayers for a change in the ownership, had more weight with the Committee than the appeal of Lord Robert Cecil to the practice of Parliament over the past 25 years. The Committee did what Mr. Balfour Browne asked them to do—they judged the righteousness of a purchase clause on the merits of the Company's case, and refused it. A more complete victory the Company could not have had; and it is one which will be of considerable service in the future to other non-statutory companies. Of course, the question is not definitely settled, inasmuch as the Council are going to make another attempt in the Lords to gain the first step towards dispossessing the Company.

Unopposed Bills and 14-Candle Power Gas.

Several unopposed Gas Bills were dealt with during the past week, both in the Lords and the Commons—viz., Brentwood, Croydon, Great Berkhamstead, Hessle, and the North Sussex measures. Some of these have, as previous notes have shown, only reached the unopposed state quite recently. There are a few interesting points to be mentioned separately in regard to the Brentwood Gas Company; the settlement in connection with the Croydon measure being alluded to last week. There is one point, however, to which the Croydon Bill gives an opportunity for reference. There is a notion abroad that Mr. Corbet Woodall is wedded to a high-power gas. Those who have closely followed his attitude in the matter of gas legislation on this point during recent sessions know differently. There have been several occasions on which he has energetically supported measures proposing 14-candle gas; and when the Croydon Gas Bill was before the Unopposed Committee of the Commons, Sir Chandos Leigh made inquiry on the point of 14-candle power, though we do not hesitate to say that Sir Chandos was previously fairly well acquainted with Mr. Woodall's views on the subject. Mr. Woodall's reply to the question was that 14-candle gas was a very useful standard for incandescent burners; and he instanced a case where a very high-power gas—20-candle—was tried, and the result was detrimental to the incandescent mantles, resulting in their blackening. Of course, a man may draw, if he likes, a bottom line for illuminating power; and whether the bottom line that Mr. Woodall has drawn is below 14 candles there is no evidence to show. But it is seen from this that it is a mistake to suppose that, if conditions are favourable (and they mostly are where the proposal for reduction is made), Mr. Woodall has but the slightest objection to 14 candles. His experience of, and association with, low illuminating power gas on the Continent has been too great to permit him to have any grave objections to gas of the quality named.

Brentwood Gas Bill.

Some time since, we had an opportunity of describing and illustrating the new works and plant of the Brentwood Gas Company; and, in view of the information then gathered, it is not at all surprising to find the Company in Parliament this year consolidating their position by an application for incorporation and statutory powers. Their Bill was before the Lord Chairman on Tuesday last, and before the Unopposed Committee of the Commons on Thursday, on which occasions Mr. W. A. Valon, who had been retained by the Company, was present to afford any required information. The Bill was passed without amendment. A little information about the Company and the Bill will be of interest. The limits of supply proposed by the Bill are the urban district of Brentwood, the parishes of South Weald, Doddinghurst, Shenfield, Hutton, Ingrave, and parts of the parishes of Little Warley, Great Warley, Cranham, and Mountnessing. The large number of parishes embraced by the proposed limits arises from the fact that Brentwood itself is a small parish and is surrounded by many others. In 1901 the population was 17,171; and now it is 19,022. The number of houses supplied by the Company is rather more than one-fourth

of the total in the existing area; so that, with their new powers, they will have excellent scope for pushing forward that progressive policy which has been a feature of the management in recent years. The existing share and loan capital amounts to £45,000; and we believe that the structural value placed upon the works by Mr. Valon is £45,949. This shows that proper provision has been made out of revenue in the past for works worn out or for any reason superseded. The additional share capital asked for in the Bill is £45,000, with one-third borrowing powers, and a further loan of £2000 on the existing share capital—making a total of £62,000. This capital, it is computed, will be sufficient to provide for an increased make of 95⅔ million cubic feet, which, it is calculated, will be reached within fifteen years of the present date. The increase in consumption in 1903 was 8·96 per cent., and in 1904 13·64 per cent. From the records, it is seen that the increment of annual increase is steadily becoming larger—a result of the introduction of prepayment meters, building development, and energy. The standard price asked for is 4s. per 1000 cubic feet within a radius of 1½ miles, and 4s. 3d. beyond. The price charged for gas the last few years has been 3s. 9d., except during the high price of coal.

Local Government Board and Model Clauses. In a report on the Brentwood Bill, the Local Government Board call attention to differences between certain of the clauses and the model ones. Clause 64 of the Bill, sub-section 1, reads: "The Company may specify the size and material of the pipes, with the fittings thereof (so far as such pipe or fittings are intended to be covered over), which are to be laid by the consumer on his premises, either in the first instance or on the occasion of any renewal." The difference between this and the model clause is that, in the case of the latter, it is not contemplated that the Company's control shall extend beyond the consumer's meter; whereas, in the clause in the Bill, it is asked that power shall be given over all pipes that may be laid and afterwards covered over. Sub-section 4 of the same clause reads: "Every meter to be used in a new building or a building not previously supplied with gas, or in connection with a new or substituted pipe laid between the main and the consumer's meter, shall be placed as near as reasonably practicable to the Company's main, but within the outside wall of the building." The difference between this and the corresponding model clause is that the latter does not cover the case where a pipe between the main and the consumer's meter is laid by the Company, which is now very often done, but only where the consumer lays his own pipe. The clause in the Bill referring to power to refuse to supply persons in debt for gas reads: "If a person requiring a supply of gas for any premises occupies, or has occupied, other premises at which gas was supplied to him by the Company, and has not paid all the gas or meter rent due from him to the Company, they may refuse to furnish to him a supply of gas until he pays the same." The model clause only provides for a case where the consumer has actually quitted premises for which he is in arrear. But the clause quoted, and which it is proposed to substitute for the model one, also provides for dealing with a consumer who, although in arrear for certain premises, has not actually quitted them. The changes are useful; and it is interesting to find, in view of the attention called to these matters by the Local Government Board, that (as previously stated) no amendment has been made in the Bill.

Stockport Water. The Stockport Water Bill was before the Police and Sanitary Committee last week; and it happens that the only part opposed was that dealing with the application of the Corporation for powers to take water from the River Kinder before the completion of the Kinder reservoir, the construction of which was authorized by the Act of 1901. There were only a couple of opponents—Mr. Norman Slack and the Calico Printers' Association, whose works are dependent in varying degree on the waters of the Kinder. The works authorized in 1901 (the contract price for the new reservoir is £248,000) are intended to provide a supply of 4½ million gallons daily. But they will not be completed for about ten years; and there are the years lying between now and then to be provided for. The supplies of Stockport now amount to 3⅓ million gallons per day; but of this about 400,000 gallons of Thirlmere water are liable to be stopped by Manchester on twelve months' notice. The actual necessities are 3,563,000 gallons; so that, as a matter of fact, there is a shortage. The proposal of the present Bill is to spend £6000 in obtaining a supplementary supply from the Kinder, to tide over the period of the new works construction which will place the town in a position of safety. Evidence by Mr. Lawson Mansergh was directed to showing that the proposals of the Corporation would not injure the riparian owners on the Kinder. The case was opened on Monday; and by Tuesday the opposition of the Calico Printers' Association had been removed by the Corporation agreeing not to abstract water until 2 million gallons had passed the Kinder intake, and that they should discontinue taking water from the Kinder in 1911, or on the completion of the works already authorized. Mr. Norman Slack was, however, more difficult to dispose of; but on Thursday he, too, succumbed to the Corporation offer of a clause ensuring the keeping of records of the water taken by them from the Kinder. The settlement of the opposition is satisfactory to all concerned. It is only an equitable thing that owners of works on a stream should be protected or compensated; but the pity of it is that agreement is so frequently delayed until after much money has been spent in the Committee rooms. On the subject of the Bill, the Committee wished it to be understood that the Corporation were not to take advantage of this supply to give up any other sources that they have at present—for instance, the amount taken from the Manchester Corporation. The Stockport representatives willingly pledged themselves to this effect—it is very nice from the point of view of Stockport. But Manchester were not present to speak for themselves; and they are not likely to be bound by any simple word-of-mouth arrangement of this kind in which they had no voice. They have their own Acts, and their own views as to where the claims of Stockport can and must end in connection with Thirlmere water. So that there is not much value in the pledge given. For the water-works loans, it is noted that the period of repayment was put at twenty years, instead of thirty.

AMENDING THE WORKMEN'S COMPENSATION ACT

The Government Measure.

LAST week we gave an indication of some of the changes it is proposed to effect by the Government Bill for the amendment of the law relating to the compensation of workmen which are of more particular interest to readers of the "JOURNAL." As was then pointed out, this measure has been drafted to carry into effect the recommendations on the subject made by the Home Office Departmental Committee after a lengthy inquiry. Of the 22 clauses of which the Bill consists, no less than 15 have reference to the two schedules of the Workmen's Compensation Act, 1897, which deal with the scale and conditions of compensation and the provision made for arbitration.

At present the amount of compensation payable to dependants is a fixed sum—a sum equal to the earnings of the deceased workman in the employment of the same employer during the three years immediately preceding the injury, or £150, whichever is the larger; the maximum payable being £300. A proviso is added to meet the event of the employment by the same employer having been less than three years, in which case compensation is calculated on the basis of average weekly earnings. Little question was raised before the Committee, either on behalf of workmen or employers, with regard to any alteration of the minimum limit of £150 or the maximum of £300 in the case of persons wholly dependent upon the earnings of the deceased workman; and it was therefore taken that these limits had in practice been found to work satisfactorily. The Bill therefore proposes no change in this respect, or with regard to the compensation to be given to partial dependants. The amount payable in case of total or partial incapacity is also (with some important exceptions) allowed to stand at a weekly sum not exceeding 50 per cent. of the man's average weekly earnings during the previous twelve months (or any shorter period, if not employed so long)—such payment not to exceed £1. The exceptions alluded to are (under certain conditions) workmen over sixty years of age, men who have been certified—owing to age or physical or mental infirmity or incapacity—to be particularly liable to accident or likely to suffer specially seriously in the event of a mishap, and persons under twenty-one years of age. Further, the manner is set forth in which, under particular circumstances, for the purposes of the present Act and of the Bill, the "average weekly earnings" are to be calculated.

First, with regard to old men. The Committee gave it as their opinion, as the result of the evidence tendered, that the Compensation Acts had largely increased the difficulties of such men finding and retaining employment. It seemed to them that the tendency was for these difficulties to grow, and that in time they would be severely felt in rural districts. A proviso has therefore been added in the Bill to the effect that "in the case of a workman over sixty years of age who has entered into an agreement in writing with his employer as to the maximum amount of compensation to be payable to him under this Act, the compensation shall not exceed that maximum;" but the maximum shall not be less, in the case of death, leaving dependants, than £25, and, in the case of incapacity, than 5s. a week. This carries out the view of the Committee that in such cases a minimum rate of compensation should be provided for, but that the parties should be free to make their own terms for a larger amount.

The same considerations, of course, apply to men who are diseased, enfeebled, or partially maimed. One witness asserted that insurance companies insisted on a condition that only suitable healthy men should be employed; but, on the other hand, the manager of one of the companies stated emphatically that, so far as his knowledge went, no action had been taken to prevent the employment of old men. The Committee, however, came to the conclusion that, in some industries at all events, old men are more liable to accidents than young, and, what is still more important, that the older a man is the more serious are the consequences which are likely to result from even a slight accident. To remove or lessen the difficulty of employing infirm or maimed persons without casting on the employer a liability of such weight as to make it hard for him to engage this class of labour at all, they suggested that an employer should be enabled to make special terms as to compensation with regard to such persons. The terms for men whose only disability is their sixty

years of age are quoted above. The weak or injured are dealt with in the provision that "in the case of a workman who has, in accordance with regulations made by the Secretary of State, obtained from a Medical Referee a certificate to the effect that his age, or any physical or mental infirmity or incapacity from which he is suffering, is such as to render him specially liable to accident, or to render the result of an accident to him specially serious, and who has entered into an agreement in writing with his employer as to the maximum amount of compensation to be payable to him under this Act, the compensation shall not exceed that maximum;" but the maximum shall not be less, in the case of death, leaving dependants, than £25 or a sum equivalent to 39 times his average weekly earnings, whichever is the larger, and, in the event of incapacity, than 5s. or one-quarter of his average weekly earnings, whichever is the larger.

With reference to men who are under twenty-one years of age at the date of an accident, and whose average weekly earnings are less than £1, the Bill stipulates that 100 per cent. shall be substituted for the 50 per cent. payable as compensation in other cases; but the weekly payment shall in no case exceed 10s. Should the weekly payment be reviewed more than twelve months after the accident at the request of either party, the amount of the weekly payment to such persons may be increased to any sum not exceeding 50 per cent. of the weekly amount which the workman would probably have been earning at the date of the review if he had remained uninjured, but not in any case exceeding £1. The next matter dealt with is the method of calculating "average weekly earnings" for the purpose of carrying into effect the provisions of the existing Act and of the present Bill. Where an employer has been accustomed to pay the workman concerned a sum to cover any special expenses entailed on him by the nature of his employment, the sum so paid shall not be reckoned as part of the earnings. And where a man has not been exclusively employed by one employer for a period of four weeks immediately preceding the injury, regard may be had to the estimated amount of the sum which, taking one week with another, was being earned previously to the injury by a person in the same grade employed in the same class of work and in the same district.

Another important stipulation is that in the case of partial incapacity, the weekly payment shall in no case exceed one-half of the difference between the amount of the average weekly earnings of the workman before the accident and the average weekly amount which he is earning or is able to earn in some more suitable employment or business after the accident. Then follow provisions as to the payment of money into Court, the settlement of the amount payable to each dependant, &c. A workman is not to be required to submit himself for examination by a medical practitioner when making a claim or while in receipt of a weekly payment under the Act, otherwise than in accordance with regulations made by the Secretary of State; and where he has so submitted himself for examination, he is not, without the leave of the County Court, to be again required to so submit himself until after the expiration of three months from the previous examination. In the event of no agreement being come to between an employer and a workman as to the latter's condition or fitness for employment, the Registrar of a County Court may refer the matter to a Medical Referee, whose report shall be final. In the event of a man refusing to submit himself for examination by such Referee, he is to lose his right to benefit under the Acts until the examination does take place. If a workman receiving a weekly payment ceases to reside in the United Kingdom, he shall thereupon cease to be entitled to receive any weekly payment; but if he proves that the incapacity resulting from the injury is of a permanent nature, he shall be entitled to a lump sum not exceeding 156 times the amount of the weekly payment.

The second schedule contains provisions for settling by arbitration questions which arise under the Acts; and in this also there are several suggested changes—mainly with reference to the registration of agreements and decisions in arbitrations by County Court Registrars.

The North of England Gas Managers' Association will hold their spring meeting at Newcastle, on Saturday, the 29th inst. The programme will include a paper on "Some Records of Improved Working Results by a Rational Treatment of the Hydraulic Main Seal," by Mr. Joseph Chisholm, of Hull, and a lecture by Mr. Dugald Clerk on "Coal Gas and its Rivals for Motive Power."

Private Bill Legislation for Ireland.—An attempt is being made by Mr. O'Doherty, the Nationalist member for North Donegal, to amend the law relating to Private Bill Procedure in Ireland; and he has introduced a Bill framed on the model of the Private Legislation (Scotland) Act, 1899. The provisions of the Irish measure are, indeed, almost identical with those of the Scotch Act.

Junior Institution of Engineers.—At the meeting of the Institution at the Westminster Palace Hotel next Friday, Mr. G. H. Hughes, M.I.Mech.E., will read a paper entitled "Practical Notes on Water-Works Construction." Starting with the sources of water, he will deal with rainfall, gathering-grounds, gauging streams and rivers, springs and wells, and gravitation supplies. He will then describe the methods of raising water by water, wind, and steam power and by internal combustion engines. The remainder of the paper will be devoted to preparing water for distribution and consumption, and to the plant employed.

THE GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 55.)

THE general tone of the Stock Exchange last week showed an improvement upon that of the preceding week. The persistent rumours that peace was on the threshold of the negotiation stage, and the confident expectation of easy money after the turn of the quarter, exercised an exhilarating effect, which was not lost even when towards the close the rumours received a check. But fresh business was not large; while the operation of settling an unusually heavy account was the main feature. Prices for the most part closed at an advance; the gilt-edged class being well to the fore. In the Money Market, there was an excellent demand, but not beyond the resources of supply, until the close of the week, when the position became one of marked ease. Discount rates, too, were lighter. In the Gas Market, the reduction in the volume of business transacted which we had to note last week was rather more marked; and on some days the market was very quiet. Perhaps the counter attractions of sport had something to do with this. The general tendency, however, was good (with the single exception of the leading issue, which was still undergoing some little reaction from its recent liberal advance); and a fair number of undertakings made some modest advances in their quotations. In Gaslight and Coke, the ordinary was a good deal less active, and more inclined to give way. The best price of the week was 99¾ on Tuesday, and the lowest 98¼ on Friday. The secured issues were quiet too. The maximum was done at 92 and 92½, the preference at 113¼, and the debenture at from 90 to 91¼. South Metropolitan was quiet until Friday, when it had a busy day. The prices marked showed a range from 129 to 130¼; the easiest prices being towards the close. The debenture changed hands at 90 and 90½. Commercials were very inactive; a couple of bargains in the 4 per cent. at 116¼ and 118 being all the business done. The Suburban and Provincial group were as calm as usual. The transactions marked showed that Brentford old realized 249 (the quotation advancing a couple of points) and Brighton original 228. South Suburban was done at 122½, Tottenham "A" at 126½, ditto debenture at 107½, Wandsworth debenture at 83, and West Ham preference at 125. On the local Exchange, Sheffield "B" was advanced to the level of Sheffield "A." The Continental Companies were all extremely inactive. Imperial marked 219 and 220½, with an advance of a point in the quotation; but no business was done in either European or Union. Tuscan had a further advance. Among the undertakings in the remoter world, Bombay old was done at 6⅝ and 6¾, with a further rise in quotation, which brings it in advance of several choice English concerns. Hong Kong was marked at 17; Cape Town at 17¼; and ditto 6 per cent. debentures at 53. Primitiva changed hands at 6 1/16, and ditto preference at 5¼. Monte Video was done several times at from 11¼ to 11⅜. River Plate was done steadily at 13⅜, and ditto debenture marked 97 and 97¼.

The closing prices are shown in our Stock and Share List on page 55.

ELECTRIC LIGHTING MEMORANDA.

Growing Complaint as to the Cost of Public Lighting—Some Fresh Examples—Reducing Expense by Light Reduction at Chester.

IN all parts of the country complaint as to the increasing cost of public lighting since the introduction of electricity is a flourishing tree. It is so prolific, that it is almost impossible to keep pace with the new shoots. Bath, Bury St. Edmunds, and Monmouth are fresh cases; and in other places electrical engineers are also having a lively time over the matter. It would be a great relief to them if someone would invent a new argument (they would, we verily believe, be prepared to take steps to have such person canonized) to replace the one that is being fast exploded everywhere, that for "improved" lighting—that is to say "improved" as electrically interpreted—the ratepayers must pay considerably more. Ratepayers cannot be expected to remain so blind that such a thin veil will for ever keep from them the true facts; and time and the perpetually increasing weight of the public lighting rate have, it is seen, most remarkable effects in increasing insight. The secret, the ratepayers find, is that the custom of the public lighting is an easy way to improve the shadowy fortunes of the municipal electricity undertaking. Certain of our electrical contemporaries treat these complaints humorously, which is a sure sign of a bad case. But ratepayers who have to find the money fail to see where the ground for jocularity comes in. It appears to be inevitable, when a local authority go in for electric lighting works, that the cost of public lighting (if the local authority are unwise enough to patronize their own "shop") should make a rapid ascent. There is the heavy initial expense, the provision for sinking fund, interest, and renewals, and the greater annual cost. It would be a good thing if gas suppliers would make it their business to show the ratepayers plainly what it all means. The excess of cost succeeding the change—seeing that for about the former cost the streets can be adequately lighted by incandescent gas-burners—should be

added on to the electric lighting undertaking's deficits, or if, fortunately, there should be a profit, then (if the profit be sufficient after allowing for depreciation) the excess cost of the public lighting should be deducted. Only in this way will the advantage or the disadvantage of the municipal electricity undertaking be shown to the ratepayers in its proper light. For it is the ratepayers who have to find the money to pay the additional cost of the public lighting.

Now for some of the examples. At Bath, there has been a meeting of ratepayers to protest against the mismanagement of the electricity undertaking and the "unjust charges" for public lighting. "More than £3000 a year of the ratepayers' money," it is said, "goes to prop up a rotten bankrupt concern for the benefit of the private consumers." Gracefulness is not a feature of this statement; but it hits the nail squarely on the head. Then from Bury St. Edmunds it is reported that last year there was a loss of £134 on the public lighting, due in part to the undercharge of 1·59d. per unit for the current; the works costs alone amounting to 1·83d. The Gas Company formerly furnished the public lighting at cost price, in consideration of a loan from the Corporation. The price was about £1 15s. per lamp; and for 321 lamps £576 was paid. It is true that all the lamps were not lighted on moonlight nights. But now the town is lighted (so it is described) with 14 electric arc lamps and 407 electric incandescent lamps, of such remarkable illuminating power that they shed over the town—of course, this is only a liberal supposition—a light equal to 24,000 candles. Public opinion refuses support to this estimate. But the cost of the lighting is £947; and, adding to this the loss of £134, it is found that the total cost is £1081, as against £576 for gas. But the reputed aggregate illuminating power of the gas-lamps was only 5136 candles, which shows that they were only fitted with flat-flame burners. Therefore for—let us say—half the excess cost of electric lighting, the Gas Company would have been in a position (having regard to the previous low cost owing to special circumstances) to supply, by means of incandescent gas-burners, at least four or five times the illumination furnished by the old form of gas lighting or the electric incandescents, during the same hours that the electricity lamps are running. The matter has been warmly discussed in the Town Council; and the statement of councillors that there has not been improvement in the lighting, even compared with the old order of things, casts doubt on the assertion as to the total illumination distributed in the streets by the electric lamps. Bury St. Edmunds is noted for its antiquities and historical associations; and with them we must wrap up this delightful specimen of His Worship the Mayor's *naïveté*, that it is difficult to arrive at the cost price of electric lighting, in view of the fact that "the number of units of electricity used is really guess work."

A like tale of complaint comes from Monmouth. It is said by the electricians that since gas has been superseded by electricity there have been more public lamps and far better lighting. Lovely simplicity! Flat flames of old, and more electric lamps in the present! No matter what the expense for public lighting when the electricity undertaking is run by the local authority; but for gas the most niggardly treatment sufficed. Most assuredly the lighting should be far better. But need the expense to realize improvement have been so outrageous, that the inhabitants should now be enraged by the annual imposition for public lighting? But though they are incensed over this, it is found, from the last returns in the "Electrical Times," that the total works costs amount to 2d. per unit, while public lighting is only charged at 1·56d. The same tale as at Bury! Rate-aided competition. It is nothing to marvel at that there was a deficiency on the Monmouth undertaking; but it means that the high expense for lighting the streets by electricity is not the only unpleasant thing the ratepayers are called upon to meet. And this is the kind of competition gas companies encounter.

Still on the question of public lighting, Chester is among the places, as late references have shown, groaning under the burden of the cost of public lighting by electricity; and therefore to the Electrical Engineer (Mr. Britton) was recently delegated the task of reporting as to whether some reduction could not be made in the cost. We sympathize with Mr. Britton; but upon the result of his profound study of the matter, we cannot compliment him, nor does his report merit respect for its complete evasion of the simple and effective method of realizing a reduction, and at the same time an improvement in lighting, by the aid of the incandescent gas-burner. We are inclined to think that the public lighting of towns and cities ought only to be entrusted to men who are lighting specialists, are absolutely impartial, and have not the interest of officials in charge of any light-supplying undertaking of the local authority. In all those boroughs of London without municipal electricity supply undertakings, and in some that have them, but where the public lighting is in the hands of an independent official, it is seen that the lighting of the streets is, as a rule, conducted judiciously, and at normal expense. An instance of the wisdom of having the advice of an unbiased official in this matter was found recently in the interesting report of the Lamp Inspector of Newcastle (Mr. George Lamb), as noticed in the "Memoranda" for March 14. An instance to the contrary is now discovered in Mr. Britton's report. This gentleman approached his task with the conspicuous narrowness of a severely prejudiced person; and the scheme he has evolved is not remarkable for its brilliance, nor will the citizens find that the result, when it is achieved, will add lustre to the night aspect of their streets. But there is this to be said in favour of the scheme, that the quantity of the illumination will be in keeping with the ancient streets and buildings of the city, and add to their quaintness in the eyes of the tourist passing through the streets after nightfall. A large part of the lighting of Chester is by incandescent electric lamps; and there is no ductility to be found in them when considering the question of reducing cost. This being so, and brushing aside completely the claims of gas, what simpler expedient could Mr. Britton discover than the weeding out from the incandescent electric lamps those that, in his depraved-by-anxiety idea of what street illumination should be, he regards as "useless?" There is something mightily grotesque about any streets lighted by incandescent electric lamps having any that they can afford to spare. It must have been a great strain on the Electrical Engineer to formulate a scheme for reduction of cost on such retrograde and unenlightened lines.

However, as the outcome of Mr. Britton's report, there are 23 arc lamps in Chester which are only to be lighted in future one night each week. The "unnecessary" electric incandescent lamps are to be removed as and when required for new districts. When parts can be used for repairs to other lamps, the three and four way electric incandescent lamps are to be converted to ¼ ampère Nernst lamps; and the 174 remaining flat-flame gas-lamps in the city are to be displaced by ¼ ampère Nernst lamps in the streets and 8-candle power incandescents in courts. To the flat-flame gas-lamps in the courts a lighting power of 13 candles is attributed, the light is to be reduced to 8-candle power by electricity at a cost of £1 8s. 10d.; while seven to eight times the illumination is offered by the Gas Company with incandescent gas-burners at the old cost per lamp of £2 14s.! However, the conversion of the remaining gas-lamps will necessitate an expenditure on cables and fittings of £1900; and then it is anticipated, after all these changes are made, that the total charge for public lighting will be reduced to a sum equivalent to a lamp-rate of 5½d. in the pound, or a total of (say) £4400. Even then the cost will be £1900 more than it was for gas when in 1897 the electricity works were started. Then the lighting was nearly all on the flat-flame system, so that it is evident the Gas Company could have brought about a vast improvement at the same price—in fact, they did offer as far back as November, 1898, to convert the flat-flame lamps to incandescents. But the Corporation would have none of it; they had their own business to back up at the ratepayers' expense. At the same time, the Gas Company were doing the lighting at a very reasonable price; for after deducting costs and interest and depreciation on the capital involved, they were only securing from 1s. 10d. to 2s. 1d. per 1000 cubic feet for the gas used, according to the varying costs. No blame can, therefore, attach to them for the loss of the public lighting. It is solely an effect of the municipal policy of subserving the interests of the ratepayers to those of their electricity undertaking. Improved lighting at less expense can be obtained elsewhere. The city councillors of Chester know it. But better, they say, let the ratepayers continue to pay more for the inferior lighting than acknowledge the truth. Chester has made a mistake; and of the light-reduction scheme, at a cost of £1900 in excess of gas, more will be heard from the ratepayers, after they have had experience of what it really means.

THE PATENTS ACT, 1902.

Objection has not been long in coming to the regulation issued by the Board of Trade in pursuance of the powers conferred upon them by the above Act. Comment was made in the "Journal" for Jan. 17 last on the rule which gave power to the Comptroller of Patents to endorse with a reference to what in his opinion is prior invention any specification which is not amended by the applicant so as to remove the objection made to it. As we pointed out at the time, such endorsement would have the effect of rendering a patent valueless; nor is there any guarantee of such efficiency on the part of the Examiners as to make it unlikely that, occasionally, at any rate, injustice will be done. In many cases it is extremely difficult to decide whether or not an invention is covered wholly or partially by a specification of earlier date, a refererence to which, however, will, so far as the public is concerned, invalidate the patent. There may be, it is true, an appeal to the Law Officer, before publication of the report of the Comptroller of Patents; but this will hardly be recognized as adequate protection. There are many technical questions connected with patents which a lawyer can hardly be expected, unaided, to decide; and, moreover, his decision is not more likely to be infallible than that of the Comptroller of Patents.

Under these circumstances it is not surprising that there should be widespread dissatisfaction with the procedure formulated by the Board of Trade. A very influentially signed memorial on the subject has been presented to the Board, strongly objecting to any "official notification being endorsed upon, or stereotyped form of reference inserted in, an applicant's specification, unless and until he shall have been notified of the Comptroller's determination, and shall have been afforded, and shall have failed to exercise, the option of himself inserting in his own specification a reference," such as "the Comptroller shall have determined ought to be made in the applicant's specification by way of notice to the public." The list of signatories to the memorial includes such representative names as those of Lord Kelvin, Sir Benjamin

Baker, John Brown and Co., Limited, Sir Henry Bessemer and Co., Limited, the Castner Kellner Alkali Company, Limited, Professor A. B. W. Kennedy, Sir William Mather, Dr. Ludwig Mond, Sir Edward J. Reed, M.P., Sir Henry Roscoe, Sir William Ramsay, Mr. James Swinburne, and many others. It is greatly to be hoped it will have the desired effect of convincing the Board of Trade that their action in this matter is contrary to the spirit, if not to the letter, of the Act of 1902, which was clearly intended as an assistance to inventors, and not as a means of penalizing them. We say this without in the least agreeing that there was any necessity for the Act in question. There are ample facilities at the Patent Office for every inventor to ascertain for himself whether or not he has been anticipated; and in our opinion any official intervention in this connection, while it may be productive of some little good in staving off palpable repetitions of previous inventions, is likely to do a considerable amount of harm by the publication of an opinion which, as likely as not, may turn out to be worthless. The mischief that it is possible to perpetrate under the Act far outweighs any benefit that may be derived from it either by the inventor or the public.

PERSONAL.

Mr. W. A. WHITE, who was employed as draughtsman in connection with the new gas-works of the Kilmarnock Corporation, and afterwards at Falkirk, has been appointed Assistant-Manager of the gas-works at Callao, Peru.

Mr. G. P. LEWIS has resigned the position of Manager of the Aldershot Gas and Water Company, and in about fourteen days' time will be leaving for the south coast, where he has obtained an interest in a business. Mr. Lewis was appointed at Aldershot in June, 1901, in succession to Mr. John Meiklejohn; and he had previously been for about ten years in the service of the South Suburban Gas Company as Assistant.

A large number of applications were received for the position of Chemist to the Gas Department of the Birmingham Corporation, in response to the advertisement which appeared in the "JOURNAL" on the 20th of January. The successful candidate is Mr. W. B. DAVIDSON, Ph.D., B.Sc., F.I.C. In making the selection, the Gas Committee had the valuable assistance of Dr. Percy Frankland, Professor of Chemistry in the Birmingham University.

A pleasing incident at the first annual meeting of the Isle of Wight Gas Association, noticed elsewhere, was the presentation to Mr. E. H. MILLARD, the Hon. Secretary, of a handsome case of meat and game carvers, in recognition of his services in the above-named capacity. The presentation was made by Mr. R. Fish, who alluded to the fact that Mr. Millard took the initiative steps in the formation of the Association, and had worked for it with considerable energy. Mr. Millard briefly expressed his thanks for the gift.

On Sunday, the 26th ult., Mr. RALPH NELSON, the Chairman of the Bishop Auckland District Gas Company, reached his Jubilee as a public representative of the town in which he was born in 1824. On March 26, 1855, he was elected a member of the Local Board, which, on the passing of the Local Government Act, became the present Urban District Council. He has served on these bodies for fifty years without a break, and has filled the chair of both. In 1859, he was elected a Guardian, and twenty years ago he was chosen as Chairman of the Burial Board. He is a Governor of the Grammar School, a member of the Assessment Committee, and Chairman of the Auckland Union Building Society. He was appointed a Magistrate for the county of Durham in 1881. We are pleased to notice briefly Mr. Nelson's long record of work on behalf of his native place, and to join with his fellow-townsmen in congratulating him upon attaining his Jubilee, and in wishing that the remaining years of his life may be peaceful and happy.

In the notice of the death of Mr. David Dulley, the Chairman of the Wellingborough Gas Company, which appeared in the "JOURNAL" last week, it should have been stated that he was a nephew of one of the founders of the Company who bore the same name.

The Projected Electrical Exhibition.—Reference has already been made in the "JOURNAL" to the project for holding an exhibition of electric lighting and the appliances connected therewith, under the control of the National Electrical Manufacturers' Association. A strong Executive Committee was formed, and they held their first meeting on the 21st ult., when Mr. E. Cunliffe-Owen, C.M.G., the Secretary of the Metropolitan Electric Supply Company, was elected Chairman, and Mr. C. S. Northcote, of Veritys, Limited, Deputy-Chairman; the Secretary being Mr. Walter Davenport. It was unanimously resolved to ask Sir William Preece, K.C.B., to take the presidency of the exhibition, which it was arranged should be held at Olympia from Sept. 25 to Oct. 21 inclusive, and he has accepted the invitation. Probably with a full consciousness of the fact that the success of the International Gas Exhibition at Earl's Court was largely due to efficient organization, the Committee have placed all the arrangements in the hands of Messrs. Bridges and Smith, of Balfour House, Finsbury Pavement, E.C.

THE STATUTORY DETERMINATION OF ILLUMINATING POWER.

By HAROLD G. COLMAN, Ph.D., M.Sc.

In the recent controversy between the London County Council and the Metropolitan Gas Companies before the House of Commons Committee with regard to the method for the determination of the illuminating power of gas, the County Council brought forward no fresh evidence in favour of the fixed 5 cubic feet rate advocated by them, but relied entirely upon the report of the Board of Trade Departmental Committee. Their case was—briefly stated—that the matter in dispute had been found too technical for the consideration of Parliamentary Committees, and had therefore been relegated to the above-mentioned independent expert Committee appointed by the Board of Trade, who after hearing evidence from both sides had made a recommendation that the 5 cubic feet rate should be adhered to in all tests made for the identification of gas supplied by the Metropolitan Companies. This view of the case evidently had very great weight with the Commons Committee in coming to their decision, which was in favour of the County Council's contention. Under these circumstances, it may be well to examine how far the above statement is really in accordance with the facts; and the more the subject is studied, the more clearly it appears that the point recently at issue before Parliament is totally distinct from that fought out last year before the Departmental Committee, although a superficial examination might lead those not fully acquainted with the subject to regard the two points as identical.

The point at issue before the Departmental Committee was substantially whether or not the true relative illuminating power of gases of different quality was more nearly given by testing them in the London argand burner at the fixed rate of 5 cubic feet per hour, or by burning them in the same burner at such a rate as to give a light of 16 candles; the illuminating power for 5 cubic feet being then calculated by proportion from the actual consumption. The latter method is the one specified in the South Metropolitan Gas Act of 1900. The County Council maintained that the former method was the correct one for determining the true relative value of all qualities of gases, and that therefore the testing clause in the Acts of Companies supplying 14-candle gas should be repealed, and the fixed 5 cubic feet rate substituted. It was agreed on both sides that gas which gave a light of 14 candles at the 5 feet rate, would give a value of nearly 15 candles at the 16 candle rate, so that the net effect of the Council's contention, if carried into effect, would be that the South Metropolitan and Commercial Gas Companies, who had obtained powers to reduce their quality of gas from 16 to 14 candles in exchange for a lowering of their standard price by 2d., would have to supply gas of nearly 1-candle power higher than they were actually doing in accordance with their Act, while their standard price would still be maintained at 2d. less than when they were supplying 16-candle gas. To bring this about was the main object of the intervention of the London County Council.

This point was thoroughly discussed before the above Committee; and their decision in the matter was practically in accordance with the views of the Gas Companies, and against those of the County Council, as they recommended that no change should be made in the quality of gas supplied by the South Metropolitan and Commercial Gas Companies. Had the Committee's recommendations stopped at this point no objection would have been raised by the Metropolitan Companies or by the gas industry generally; but they then proceed to make the following statement (§ 12):—

> It appears to the Committee that, in selecting the method to be adopted for testing, the object to be aimed at is not so much to measure the relative values of different qualities of gas as to define the quality of the gas without ambiguity. This is best accomplished by giving in each case its illuminating power when burned under known conditions; and it is desirable that the conditions under which it is burned—*i.e.*, the method of testing—should be uniform as regards all qualities of gas.
>
> They therefore accordingly recommend (§ 30 *a* and *b*)—
>
> (*a*) That the standard burner to be used for testing the illuminating power of all qualities of gas should remain as at present, the Sugg's "London" No. 1 Argand burner, and that the chimney to be used therewith should be of uniform size—namely, 6 inches long and $1\frac{7}{8}$ inches internal diameter.
>
> (*b*) That, for the purposes of determining the nominal illuminating power of gas of any quality, the gas should be burned in the standard burner at the rate of 5 cubic feet an hour.

This recommendation therefore raises a matter which is entirely distinct from the one which had been fought out before the Committee. It is no longer a question of what the actual quality of the gas supplied by the South Metropolitan and Commercial Gas Companies should be for the 2d. reduction in the standard price (as this is to remain unaltered), but solely a question of the manner in which the gas is to be tested, and its denomination. It was upon this new point that the contest took place last month in the House of Commons Committee room; and the Gas Companies rightly maintained that this matter, contrary to the statement made on behalf of the County Council, was not fully discussed before the Departmental Committee, and that no evidence with regard to this proposal was there offered by them. It is true that, during the

inquiry, members of the Committee did, on one or two occasions, ask whether it would meet the case if gas supplied by the South Metropolitan and Commercial Companies were to be tested at the 5 cubic feet rate, and be called 13 instead of 14 candles; but in no case was the point fully discussed. Similarly on other occasions the suggestion was made that, instead of calling the gas 14-candle gas, it should be defined as gas which gives a light of 16 candles when burned at the rate of 5·71 cubic feet per hour; and this proposal was likewise never gone into in detail. The Committee's recommendation therefore came as a surprise to the Gas Companies, and had they previously entertained any idea that such a proposal was likely to be definitely made, they would undoubtedly have at once asked to be allowed to lay before the Committee the evidence they recently brought forward against it in Parliament.

In this recommendation the following assumptions are made (tacitly or otherwise):—

(1) That the matter concerned is solely one of nomenclature, and of defining the quality of gas supplied by any undertaking in such a manner as to enable controlling authorities to ascertain that the quality of gas actually supplied is in accordance with statutory requirements, and that there is no advantage in having a test for such purposes that gives figures representing the true relative values of different gases.

(2) That the equivalent value of 14 candles tested at the 16 candle rate is 13 candles, when tested at the 5 cubic feet rate.

(3) That the proposed method is applicable to all qualities of gas, and that by its means "uniformity in the conditions of testing" is obtained.

On the part of all those who have had experience not only in testing the illuminating power of varying qualities of gas for identification purposes, but also for ascertaining their relative value in connection with the actual manufacturing process, there is an almost unanimous agreement that these assumptions are all incorrect.

Some of the evidence against the first and second of these assumptions has been previously dealt with (see "JOURNAL," June 21, 1904, p. 843); and many additional points were brought out before the Parliamentary Committee. It is therefore only intended to deal here with the third assumption, which is the most unsatisfactory of all, and which remains equally objectionable if it is assumed for the purposes of argument that the first two assumptions are correct.

Everyone connected with the gas industry is as desirous of having "uniform conditions of testing" as were the Departmental Committee; but they feel equally strongly that the method proposed by them entirely fails to bring this about. Absolute uniformity of conditions is manifestly impossible; and the object aimed at is to arrange that the inevitable variation shall take place in such point or points as are of least importance. One or other of the following conditions must be varied if the other two are to be maintained uniform:—

(1) The burner employed.
(2) The rate at which the gas is burned.
(3) The conditions under which combustion takes place within the burner.

Assuming that the London (No. 1) argand is to be adopted as the uniform burner, it then becomes a question which of the other two factors is to be made the variant. The Departmental Committee have recommended that the rate of burning shall be made the constant, and that therefore the conditions under which combustion takes place in the burner shall be the variant, for all qualities of gas. The result of this is that all gases of under 16 candles will be burnt with an excess of air, and a part of their potential luminosity will thus be destroyed; while gas of above 17 candles will be burned with an insufficient quantity of air, and the full luminosity will therefore not be developed. As the recommendation refers to *all qualities of gas*, it must be assumed that the Committee regard the method as applicable to 20-candle gas, such as is being supplied in Liverpool, and to the still higher qualities produced in Scotland. These gases, however, unless containing a very large proportion of carburetted water gas, will, at the 5 cubic feet rate, give a smoky flame extending right beyond the top of the chimney, and will quickly render the atmosphere of the photometer room intolerable, and no one, even for "identification" purposes, would dream of testing gas under these conditions. The absurdity of the procedure is, however, no greater with high-grade than with low-grade gases, the only difference being that the futile nature of the method is at once manifest to the eyes and nose in the former case; whereas, in the latter, a little thought is required in order to recognize it.

Even assuming that the question is merely one of nomenclature and identification, it is very difficult to understand how the Committee, having in their minds the advantages of finding a method which would be applicable without ambiguity to all qualities of gas, can have recommended a procedure which is manifestly inapplicable to the testing of high quality gas even for such purposes. On the other hand, if the rate of consumption is made the variant, and the conditions under which combustion takes place in the burner are made as uniform as practicable, the method is equally applicable for identification purposes to all gases from 40 candles downwards; and there is certainly no greater departure from "uniformity of conditions" than there is when the consumption is kept constant. Moreover, the values then found represent, with sufficient nearness for practical gas-works purposes, the relative illuminating values of different gases. One and the same method can then be employed both for comparison purposes in the works, and for identification purposes beyond them, instead of having two different methods of testing, giving results between which no constant ratio exists.

Such a difference in methods of testing, which is inevitable if the Departmental Committee's recommendation is confirmed, though it is not unknown in other industries, is universally agreed to be most objectionable; and the tendency of modern science and practice is the unification of methods. While this was doubtless the intention of the Committee, the actual result of their recommendation will be the exact opposite. Had they, like the Standards Committee of 1894, themselves made experiments and extended them over gases having a wide range of quality, I am convinced that this proposal would never have been made.

Although only the Metropolitan Gas Companies are directly concerned in the matter, the whole gas industry is likewise indirectly affected, as if the decision of the House of Commons is confirmed by the House of Lords, and the London County Council Gas Bill becomes law, this will form a precedent, and the same method of testing will probably be enforced in the Bills of all gas undertakings as they come to Parliament. It is therefore most desirable for all who are convinced that the Departmental Committee have come to a wrong conclusion with regard to the matter of testing, to combine together to bring forward evidence showing that such is the case, and to stand united in their endeavour to obtain a reversal of that decision.

THIS YEAR'S "QUESTION-BOX" VOLUME.

As we are going to press, advance copies of the 1905 volume of the "Question-Box" of the Ohio Gaslight Association has reached us from the Editor (Mr. Henry L. Doherty); and contributors to the volume in the United Kingdom will also in due course each be receiving a copy. The volume is a bulky one; comprising in all some 916 pages. Our first words must be of congratulation to the Editor on the expedition with which he and his staff have managed to produce such an amazing volume. It is a monument to a solid year's work. The opening words of Mr. Doherty's preface are evidence of the greater encouragement he has received during the year; and the volume itself is a testimony to the Editor's perseverance, and a justification for his resistance to gibe and opposition. Many who once scoffed at the system are now among its most ardent supporters. Its popularity is evinced in remarkable manner by the growth in the number of questions, answers, and contributors:—

Year.	Questions.	Contributed Answers.	Contributors.
1903	173 ..	685 ..	83
1904	267 ..	1060 ..	150
1905	567 ..	4920 ..	519

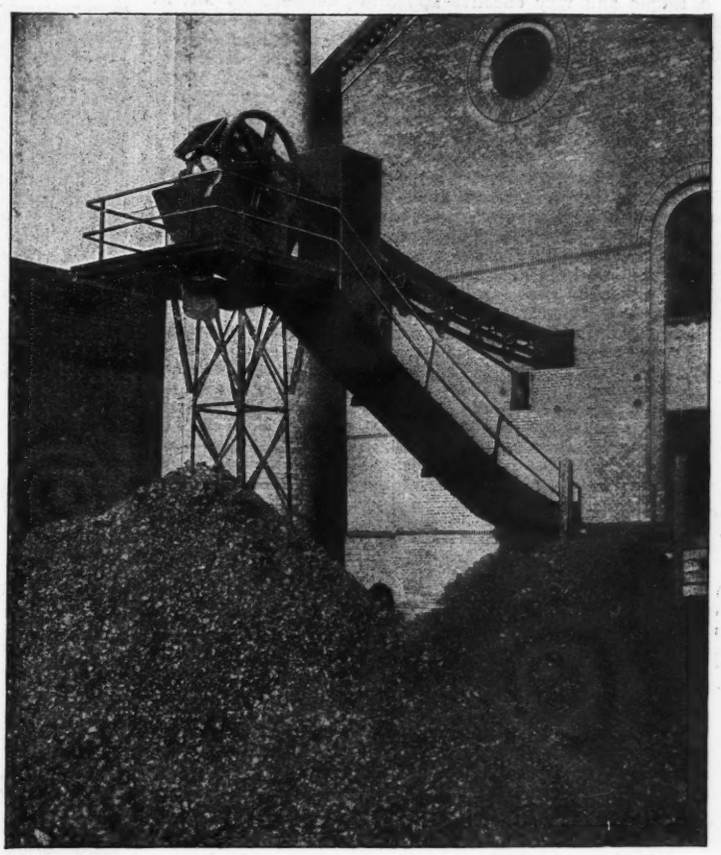
Among the other interesting points bearing on the magnitude of the work, it is gathered that the expenses of the volume will amount to nearly four times the revenue of the Ohio Association for the year 1904; or, stated in other words, the expenses will be approximately 50 per cent. of the aggregate revenues of all the Gas Associations in America. In addition, it will cost $600 alone to distribute the book after it leaves the binder's hands. In the office of the Editor, 7200 hours have been expended in gathering the questions, sending out the lists, and getting the copy ready for press. Added to this is the work put into the volume outside the office—from the forwarding of the questions to the printing and issuing of the massive result. These points we mention to show that the work has been taken up in a vigorous manner; and that labour and expense in pushing forward this special undertaking of the Ohio Association are with them matters of secondary consideration. And that is what we should like those to remember who cast their criticism of the work in the most distasteful of sarcastic style. In the whole, 7000 men were invited to contribute; and the result was that 2200 have signified their interest in the publication, and 519 have contributed answers. This year the volume, in the matter of its contributors, is international in character; and we heartily thank Mr. Doherty for his recognition, in his preface, of the co-operation from this country. What the Ohio Association are trying to do is to build up a "perfect handbook." From the mass as represented by the annual collections, the Revision Committee (under Dr. Harrop) are extracting the essence.

At the meeting of the students of the Institution of Civil Engineers next Friday, a paper on the "Bath Corporation Water-Works Extension" will be read by Mr. J. R. Fox.

Mr. Peter Watson, late Manager of the Stirling Gas Company, who died on Nov. 16 last, aged 81, left personal estate valued at £4618 13s. 8d., of which £1137 represented the value of shares in the Company which he held. He also had shares in the Metropolitan Gas Company of Melbourne, and in many other companies.

THE BAMAG-MARSHALL COKE-CONVEYOR.

The De Brouwer and Merz types of coke-conveying troughs involve, according to an article in a recent number of the "Journal für Gasbeleuchtung," a dragging or pushing movement of the coke wholly or partially; and lately, therefore, an endeavour has been made to hit upon a construction by which the coke is entirely carried up to the point of discharge. Simple bridges or small waggons of sheet iron, such as are used for coal-conveyors, were tried; but the red-hot coke, if not immediately quenched, caused the plates to warp, and the various parts of the apparatus then ceased to work well together. An attempt has been made to overcome these faults by constructing a grid-conveyor; and an improved form of this type, in which the conveyor consists of a number of easily detachable elements or baskets, has been patented by Mr. F. D. Marshall, the former Chief Engineer of the Danish Gas Company. Three illustrations of this conveyor, and a short description of it, were given in the "JOURNAL" for Nov. 22 last (p. 587). We are now able to reproduce from our German contemporary the annexed view of the discharging end of the conveyor in the yard of the Danish Gas Company at Aalborg.



The advantages claimed for the conveyor are: (1) The coke is carried right to the discharging point from the time it is delivered from the retorts. (2) The quenching of the coke is effected rapidly and on all sides, as the water trickles through the grid very quickly. (3) The conveyor is reliable in operation, as the separate elements can be changed in a few minutes in case of need. Parts of each basket can also be rapidly replaced. (4) The small coke, dropping through the grid, forms a protecting layer, which preserves the trough from injury. Every fifth or sixth basket has its transverse rod made so deep that it leaves a space of only one-fifth of an inch to the bottom of the trough. Thus there remains a protecting layer of small coke of this depth in the trough, and the strengthened rods carry whatever coke stands above this on to the discharging end of the conveyor. The friction is therefore of coke upon coke, not of coke upon metal. The chain is either rigidly attached to the chain rollers, or the rollers are attached to the outside of the trough, and the chain runs free on them. The supporting rollers for the returning chain are of greater diameter. There is only rolling friction, so but little power is requisite. One man can without overstraining himself propel the chain at the Danish Gas Company's installation. This installation has already worked for nine months without any failure.

TREATMENT OF GAS LIQUOR IN SWITZERLAND.

It appears from a communication made by M. Albert Utinger to the Swiss Association of Gas Managers, at their meeting at Lausanne last September, that there is room for a greatly extended use of plant for the treatment of ammoniacal liquor in the gas-works of Switzerland. Out of the 45 works included in the statistics of the Association, in only 14, or about one-third of the total, is the liquor utilized for the production of sulphate of ammonia, volatile alkali, or concentrated liquor. The return, however, in the shape of ammonia, was at the rate of 1½ kilogrammes per ton of coal carbonized; the total products being sold for 375,000 frs. (£15,000). In the 14 works referred to, there are carbonized, according to the last returns, 221,000 metric tons of coal; and the receipts for ammonia work out to 1 fr. 70 c. (1s. 5d.) per ton. The other works carbonized about 41,500 metric tons; and if the resulting liquor had been treated, a return amounting to some 70,000 frs. (£2800) would have been obtained. M. Utinger explained that there were various reasons which militated against the extended adoption of plant for dealing with ammoniacal liquor, chief among which were want of space, reluctance at incurring expense, fear of inadequate return if incurred, and prejudice against new methods of working. He, however, was led by a combination of circumstances to make a departure, in the small gas-works at Zong, in the direction indicated. He could not dispose of his liquor to farmers, because though they had taken some of it off his hands to mix with liquid manure for use as a fertilizer, they declined to pay for it; and, moreover, they were very uncertain in their demands, which were so irregular as to cause him some inconvenience in storing the stuff. Nor could he get rid of it by throwing it into streams, as by so doing he would have rendered himself amenable to the Federal law. At this juncture, it was suggested by Dr. Gutknecht, of Zurich, that sulphate plant should be installed at his expense by way of experiment, with the view of showing that the treatment of ammoniacal liquor by his process, which was described in the "JOURNAL" for the 17th of May last year (p. 448), could be made remunerative even in works so small as those at Zong, which stand 38th in the Association's list. The offer was accepted, and it was arranged that the plant should be purchased if, at the end of a year, it was proved that there was a prospect of it paying its way. Work was started in September, 1903; so that at the date of the meeting M. Utinger was in a position to present to his colleagues some reliable figures. Most unfortunately, the inventor of the plant died in the spring, and consequently did not have the gratification of witnessing the results obtained.

It was found in the course of the trial that the plant could be arranged much more simply than Dr. Gutknecht had specified; and that another point on which he had been mistaken was in supposing that it could be erected in the open air. Nor was the yield of sulphate so great as he had stated it would be—viz., 10 kilos. (22 lbs.) per ton of coal carbonized, or 1·8 kilos. (4 lbs.) of ammonia, but only 1·2 kilos. (2½ lbs.). The yield was consequently 20 per cent. less than the average in large gas-works. M. Utinger thought this might have been due to the quality of the coal carbonized. He described the process as simple, easy to understand, and quite free from danger, as no acids are employed, and there are no noxious emanations.

The following are the items of expenditure in connection with plant for works carbonizing 2000 metric tons of coal a year:—

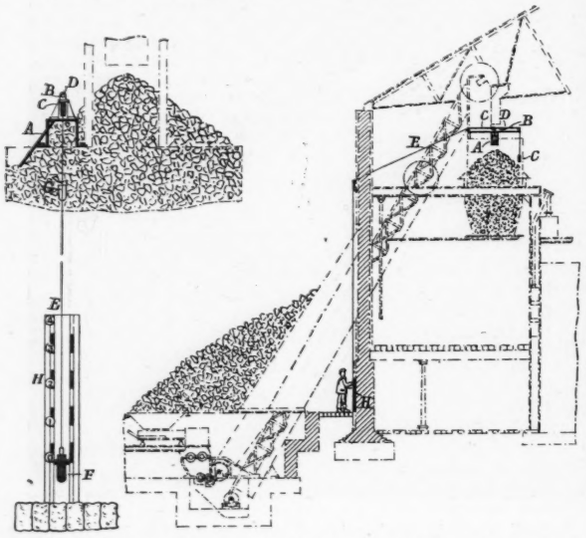
	Francs.		Sterling.
Gypsum (14 tons)	250	..	£10
Power for pump	100	..	4
Wages	1200	..	48
Repairs, &c.	100	..	4
Interest and sinking fund	300	..	12
Add to make even money	50	..	2
	2000	..	£80

The revenue was 2400 frs. (£96) for 2400 kilos. of ammonia. The profit was consequently 400 frs. (£16). M. Utinger pointed out that the plant would be profitable even if the expenses were greater, which, of course, would depend upon locality. He concluded by remarking that, like many other inventors, Dr. Gutknecht, who was not favoured by fortune, did not reap the reward of his labour, mainly because he lacked the ability to do proper justice to his invention.

HOVEY'S PATENT INDICATOR FOR COAL-HOPPERS, &c.

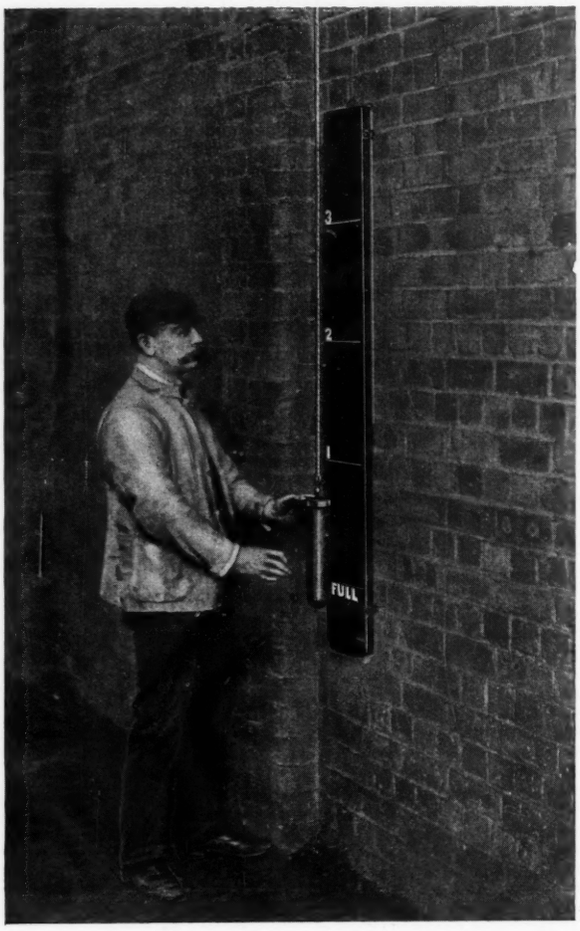
A simple and very effective apparatus, designed by Mr. A. Clement Hovey, has been in operation for some years at the Tynemouth Gas-Works for ascertaining the depth of coal contained in the overhead hoppers supplying the West's stoking machinery. We illustrate the general arrangement of the apparatus which enables the coal-breaker attendant to see whether the hoppers are full without ascending to them, as an indicator board in connection with the apparatus is fixed near the coal-breaker for ready inspection.

To describe the working of the apparatus with reference to the diagram: When the hopper is full of coal, the latter comes into contact with the hinged plate A, and causes it to move radially and operate the trip-lever B, which relieves the catch C sliding along the guide-rod D. To the catch is attached a light wire rope, having a counterbalance weight G at one end, and the weight F at the other end—the latter arranged in front of the graduated indicator board H. When the catch is released, the weight F descends, and the weight G rises; and when the hopper is partly filled, and the weight F is raised, the weight G falls and rests on the coal and the rope becomes slack. The position of the indicator in front of the board shows the depth of coal in the hopper.



ENLARGED VIEW OF INDICATOR GEAR.

SECTION OF ELEVATOR WITH INDICATOR GEAR ATTACHED.



The apparatus is of considerable value in saving labour, time, and supervision; and in the case of the installation at the Tynemouth Gas-Works it is said to effect an annual saving in labour of about £175.

Several sets of this apparatus have been, and are being, introduced into installations of West's stoking machinery by West's Gas Improvement Company, Limited, of Manchester, who are the sole makers of the apparatus.

ISLE OF WIGHT GAS ASSOCIATION.

The First Annual Meeting of this Association, which was formed in the autumn of 1903 for the promotion and advancement of the various movements connected with the gas industry of the Isle of Wight, as well as to afford opportunities for the discussion and consideration of matters of professional and commercial interest, was held in the Board-room of the Newport Gas Company on Saturday, the 25th ult. Mr. H. J. IBBOTSON, the Engineer and Manager of the Company, occupied the chair; and he was supported by two of the Directors (Messrs. Wooldridge and Pinnock). There was a full attendance of members, including the Engineers and Secretaries of the various gas concerns in the Island, accompanied in many instances by their Directors and Committee men, all of whom were warmly welcomed by the local Directors.

The Committee of Management brought up a report on the progress of the Association. The first general meeting, held in response to a circular letter sent out by the Hon. Secretary (Mr. E. H. Millard, of Cowes), assembled at Newport on Sept. 11, 1903, when the best means of advertising to be adopted to meet the competition of the electric light, were discussed. As the result of subsequent meetings, several handbills and post-cards were distributed, with excellent results. After this, a public challenge as to the relative costs and lighting values of gas and electricity was issued to the Electric Light and Power Company, who, however, declined to take it up. Coke was one of the earliest and most difficult questions taken in hand, and, as the result of the efforts of the Committee, considerably more remunerative prices have been obtained. The subject of the retail sale of tar was also investigated, and a working arrangement arrived at. The Association have also introduced to the public Lucas lamps and other improved appliances for the use of gas for domestic and business purposes on advantageous terms. Working in conjunction with the local gas engineers, the lighting of many public buildings—notably the Town Halls at Ryde and Sandown—has been secured. But in order still further to push the sale of gas in every direction, to give advice to consumers on improved forms of lighting, and to show that, as regards cheapness, reliability, convenience, and safety, gas still holds its own easily in competition with electricity for lighting, motive power, and heating, the services of a canvasser have been secured, to apportion his time among the various undertakings. During the period covered by the report, ten general and a like number of Committee meetings were held, at which many matters of a technical character were discussed, with advantageous results.

The report, after having been favourably discussed, was formally adopted, as was also the statement of accounts, which gave evidence of economical working.

The Committee of Management, Secretary, and Auditor (Mr. W. Halliday, of Cowes) were duly thanked for their services and unanimously re-elected; and it was resolved to hold the next general meeting at Ryde.

In order to further the usefulness of the Association, a resolution was passed, affirming the desirability of the reading and discussion of technical papers at future meetings; and it was understood that the Committee of Management will make the necessary arrangements.

A hearty vote of thanks was accorded to the Newport Gas Company for the use of their room, and their hospitable entertainment. This was duly acknowledged by Mr. Wooldridge and Mr. Pinnock, both of whom testified to the benefits accruing from the establishment of the Association to the various gas undertakings, as well as to the gas consumers.

Mr. Frank C. Taylor (Shanklin) proposed a hearty vote of thanks to Mr. Ibbotson for his able conduct in the chair. The motion was seconded by Mr. J. S. Ineson (Ventnor), and carried by acclamation.

LONDON AND SOUTHERN DISTRICT JUNIOR GAS ASSOCIATION.

Ammoniacal Liquor and the Manufacture of Sulphate of Ammonia.

The members of this Association, at their Monthly Meeting on Friday—held at the Regent Street Polytechnic, under the presidency of Mr. Walter Grafton—had submitted to them a paper by Mr. R. L. Fenner, of the Poplar works of the Commercial Gas Company, entitled "Ammoniacal Liquor and the Manufacture of Sulphate of Ammonia."

The value of ammonia has, of course, long been recognized; and Mr. Fenner pointed out that even Winsor a century ago was fully alive to the usefulness of the ammoniacal liquor resulting from gas manufacture—in fact, he calculated its worth at no less than 1s. a gallon. The working up of the liquor was not at first taken advantage of; the difficulties met with in the manufacture of the gas being so great as to monopolize nearly the whole of the attention of the early gas engineers. But as the industry settled down, and a knowledge of chemistry began to spread, the value of the liquor began to be generally recognized. At the present time, the production of sulphate of ammonia in the United Kingdom from gas-works alone is nearly 150,000 tons; and if the output of iron-works, coke-ovens, and other manufacturing operations of a similar character, is added, a total of over 200,000 tons is arrived at, the value of which, at the existing price, is about £2,500,000. The amount of liquor contained in a ton of coal varies considerably; but the author said that 30 to 40 gallons of 8-oz. strength would cover the producing qualities of most coals. Here he took the opportunity to point out that the term "8-oz. liquor" does not, as is often imagined, mean a gallon having for its contents 8 oz. of ammonia. It means liquor containing that quantity of ammonia per gallon which requires 8 oz. of pure acid to neutralize it; the actual contents of ammonia in a gallon being 2·776 oz.

After explaining the formation of ammonia during gas manufacture, Mr. Fenner turned his attention to the manufacture. Gas liquor, he said, contains certain substances volatile at ordinary temperatures, and which are driven off in the free still in their compound state. Decomposition, however, takes place in the saturator, and gives rise to conditions which seriously affect the colour of the salt, unless under careful supervision. The fixed portions of the ammonia are decomposed in the lime still; the resulting ammonia being driven off in the free state till it reaches the saturator, where simple combination with the acid takes place. Roughly, ammoniacal liquor may be said to consist of ammonia in combination with a number of acids, chief of which are carbon dioxide and sulphuretted hydrogen; and provision for dealing with these is necessary after the ammonia has been extracted. The ammonia is present in the liquid in combination with these and other elements; the bulk of the compounds, amounting to four-fifths of the whole, being in a volatile or free state—that is, the compounds containing the ammonia can be driven off by heat alone. This part is dealt with in what is called the free still. The other one-fifth exists in a fixed state; and these ammonium compounds are decomposed by the addition of a more powerful alkali—the ammonia being set free.

Mr. Fenner pointed out that the earliest method of dealing with the total ammonia was by heating in a boiler by direct firing; and after the ammonia had been driven off, adding the alkali to expel the remainder. This method has, however, now been abandoned; and steam is universally used. He said that when his father had charge of the plant at the Beckton works, this was the process carried on. In fact, they did not even recover the mother liquor which drained from the sulphate. It was run into the ground; and, of course, in time the foundations gave way, necessitating new plant being put up. It need hardly be pointed out, he added, that the Beckton plant was now in the very first rank. But the boiler is still retained in many works for dealing with the fixed ammonia. Its simplicity, the author said, is undeniable; it consists merely of a boiler-shell containing a perforated pipe laid lengthwise along the bottom, through which steam is blown, which agitates the lime and supplies the necessary heat for the liberation of ammonia. It is worked in conjunction with a still which deals with the free compounds first, and which is generally placed at a higher level. This is the system that is followed at the Poplar works of the Commercial Gas Company. The free still is of very simple form, but great efficiency, and consists merely of a 48-inch main in which a series of trays are placed at a distance of about 8 inches apart—one tray having a hole in the centre, and the next one having a space round the edge. The plates are supported on legs; the first one being well caulked all round. The idea of caulking the first tray is so that the liquor shall not escape down the sides, but have to travel over as much space as possible. The liquor, in passing from tray to tray to the bottom of the still, is prepared for its entry to the boiler, which is filled up to a certain mark. Lime is added, and distillation goes on for a measured period, while the liquid is gradually filling up a second boiler. One of the advantages of this method, Mr. Fenner pointed out, is that the liquid can be tested before being disposed of; and if necessary distillation may be prolonged.

The author next proceeded to describe the Feldmann still, and to impress upon the members the need for cleanliness in the manufacture of sulphate—the lime stills needing special attention. In this connection, he referred to the fact that many stills had been constructed in such a manner as to necessitate taking to pieces to remove obstructions, and drew attention to a moveable weir lately patented by the Chemical Engineering Company, which can be taken from the still for cleansing purposes. He then dealt with the saturator, of which he said there are many forms, though they may be roughly divided into two classes—the open and the closed, with either of which effective work may be performed. He then described the working of these two classes of saturator, and the acid which it is necessary to employ. The author next referred to discoloration; remarking that, upon the strength at which the liquid in a saturator is kept, depends to a great extent the quality and colour of the sulphate made. The varieties of colour which it is possible to obtain in the manufacture of sulphate are, he said, many; and they are caused by the impurities present in commercial acid or ammoniacal liquor. Many evils in the matter of discoloration may be avoided by keeping the liquid in the saturator well on the acid side. At the Poplar works, a strength of 58° Twaddel is maintained, with very successful results. In no case is it safe to work at a lower strength than this; while it is sometimes found necessary to go to a higher figure—a necessity caused by other reasons having a bearing on the point, such as the quality or the strength of the acid or the efficiency of the steam supply. The latter has a considerable effect on the colour of the salt; a lack of steam often being productive of rainbow tints. An almost infallible cure for this evil is to increase the acid supply; but it must be remembered that a large excess of acid results in the formation of a very heavy salt, and a large percentage of free acid in the finished article, which does not help the sale. Three per cent. of free acid will give good results. As to the amount of liquor required to produce a ton of salt, the ammonia in a gallon (2·776 oz.) added to the 8 oz. of acid gives a total production of 10·776 oz. of sulphate; and this figure divided into a ton gives the number of gallons of 8-oz. liquor needed. If the acid is of 70 per cent. strength, 11·43 oz. will be required instead of 8 oz., per gallon, so that for a ton of sulphate 21 cwt. 1 qr. will be the acid used. Mr. Fenner pointed out these are theoretical figures, and that some loss of ammonia and acid is bound to take place; but the figures are of value in the detection of bad working. The paper concluded with some remarks on the different methods of disposing of the waste gases from the saturator. At the Poplar gas-works these gases, after being cooled, are led to the sulphur kilns of the sulphuric acid process; and the sulphur dioxide formed thereby adds considerably to the make of acid. Mr. Fenner advised all those who were interested in the subject to study a paper by Mr. George Keillor, jun., read before the North British Association of Gas Managers, and which was given in the "JOURNAL" for Aug. 11, 1903.

That the members had been interested in the contribution was shown by the number of questions that were subsequently put to the author. The first was one by Mr. Carpenter, who wanted to know what was the pressure of steam at Poplar; and the answer was 9 lbs. Mr. Grafton thought this was rather low, and would have taken it to be nearer 15 or 20 lbs. Mr. Chree asked what were the obstructions in the still that were referred to in the paper. Were they suspended particles of tar? Mr. Fenner said there was a certain amount of tar; but this was mostly collected in a well at the bottom of the free still. There was a heavy incrustation on the side of the still; but exactly what it consisted of, he confessed he did not know. Perhaps it was caused by carbonates. He noticed that a little while ago there was not only a very heavy growth on the side of the still, but the plates were thickly coated—in fact, the hole in the centre was in many cases nearly closed. The cleaning out of the stills, however, was not a very frequent occurrence. Mr. Chree next asked whether leaving the salt in the saturator for a longer period than necessary had any effect at all on its quality. With regard to the disposal of the effluent liquor, he believed that the best method of getting rid of it was by quenching coke with it. This was what was done at his works. If any trouble arose with the local authorities, there was always this plan to fall back upon. Mr. Grafton remarked that the effluent liquor, or "devil water," was often returned to the ammonia still; but this reduced the efficiency of the sulphate plant, because the liquor was of less ounce strength per gallon. A better plan was to use it in the scrubbers again, when it could not be sent down a drain. If, however, neither method could be adopted there was a third way—filter it through an oxide purifier. There was also a fourth plan—namely, in small works where there were regenerator settings, to run it into the ashpans under the furnaces, where it was evaporated; the offensive steam passing through the fires and the noxious gases being burnt. It was not burnt up when used for quenching coke; but still this constituted a fifth way of dealing with it. Mr. Twigg asked if the pressure in the saturator had anything to do with the colour of the salt. Mr. Fenner replied that leaving the salt in the saturator for an unnecessary time would probably affect the colour, because it had a longer contact with any impurities that might be present. This question by Mr. Chree and the one by Mr. Twigg might be really answered in one. If there was a good pressure in the saturator, it meant that the salt would be thrown down quickly; but if this did not happen, he did not think there would be any effect on the salt except discoloration.

Mr. Gill said he would like to know the amount of sulphate of ammonia to be obtained from a ton of coal with good working. Mr. Grafton remarked that the Commercial Gas Company were

working with 14-candle gas, and were bound to have good makes of gas per ton. They must therefore have high heats, and so could not obtain a big yield of ammonia. Speaking generally, however, the average figure might be taken as being somewhere in the vicinity of 25 lbs. of sulphate per ton; but when fair heats were employed, 30 lbs. would be yielded. In manufacturing carburetted water gas, ammonia was not formed. This was due principally to dissociation. Beyond a certain temperature—approximately, not quite, 1000° Fahr.—the ammonia was broken up; and thus at higher heats its formation was impossible. To produce water gas a temperature was needed of something like 2000° Fahr.; and therefore it was impossible to get ammonia. Of course, nitrogen was the source of the ammonia; and from nine-fiftieths to one-third of the nitrogen in the coal went to make ammonia, the exact amount, as he had said, depending upon the temperature of carbonization. Mr. Barnett was anxious to know whether it was better to have a weak liquor or a strong liquor. Mr. Fenner replied that the cost of fuel was very much greater per ton of sulphate when working with weak liquor, and much stronger acid was required. The economy due to fuel and the smaller amount of effluent to be dealt with were the principal advantages of using strong liquor.

Mr. Hollington asked what percentage of ammonia passed from the apparatus—that was to say, went away with the effluent. Mr. Fenner said this should always be brought down to at most $\frac{1}{8}$ oz. Their record at Poplar was never more than $\frac{1}{16}$ oz. Mr. Barnett inquired what was the cause of the frothing over of the saturator; and Mr. Fenner said he thought this only arose, with the working up of ordinary ammoniacal liquor, by having too much going through the still. In the case of the Poplar still, it would be through having it too heavily charged. Of course, when the steam bubbled through the lime and liquor, it naturally would tend to produce frothing. If the still was too fully charged, a certain amount of this would be carried on into the saturator. Any foreign matter present in the liquor would probably add to the frothing. Mr. Chree asked whether there was any advantage in the formation of large crystals in the sulphate of ammonia. He had seen a case in which the size of the crystals had been urged in favour of a particular sulphate; and he wished to know if there was any commercial value in having a large crystal. Mr. Grafton did not think the size of the crystals had much to do with the matter. As far as agricultural purposes were concerned, the finer the sulphate was the better. Mr. Fenner pointed out that with very small crystals the salt was sometimes heavier; the large crystals tended to make it lighter.

With reference to the 70 per cent. acid mentioned in the paper, Mr. Grafton remarked that the usual acid for making sulphate was 142° Twaddel. This had a specific gravity of 1·760, and was known as "seconds." It contained 78 per cent. of pure acid; and between 17 cwt. and 18 cwt. of it was required to make a ton of sulphate, as compared with the 21 cwt. 1 qr. mentioned by Mr. Fenner. The latter was a weaker acid; and therefore more of it was wanted. He referred the members to a paper read by Mr. C. Tanner, jun., of the South Metropolitan Gas Company, before the Gas Engineering Society, some particulars from which appeared in the "JOURNAL" on Jan. 19, 1897. Mr. Sears inquired whether it was more economical to use lime than caustic soda. Mr. Fenner said he should think the cost of the latter would be prohibitive. Of course, if it were used there would not be so much cleaning out to do; but this was not a very great consideration. Mr. Sears replied that at his works they used caustic soda for the liberation of the fixed ammonia from the liquor; the average quantity employed being about 13 lbs. per ton of sulphate of ammonia made. In answer to Mr. Grafton, Mr. Fenner said the amount of lime they worked with was 4·7 lbs. for every ounce of fixed ammonia in 10 gallons.

On the proposition of Mr. Grafton, seconded by Mr. Ainsworth, a hearty vote of thanks was accorded to Mr. Fenner for his paper, interest in which was largely augmented by the display of a number of different samples of coloured sulphate, liquor, &c.

Waverley Association of Gas Managers.—The eighty-eighth half-yearly meeting of the Waverley Association will be held at the Royal Hotel, North Berwick, next Thursday week, the 13th inst., under the presidency of Mr. James Gemmell. In addition to the formal business, there will be an address by the President. The meeting will be followed by a visit to the new Corporation Gas-Works; and at the conclusion of this, the members and friends will dine together.

Liquid Gas.—When exposed to great pressure, coal gas or oil gas may, like all other gases, be liquefied; and liquid gas, called by the inventor "blue gas," is now, according to a recent number of the "Gesundheits-Ingenieur," as quoted in the Engineering Supplement to "The Times," being prepared at Augsburg, and sent out for sale in steel cylinders which each contain 22 lbs. of the liquid. This volume will furnish approximately the same amount of illumination as would be obtained from 132 lbs. of petroleum oil, burnt with the ordinary circular wick, and it would maintain a 30-candle power lamp for 660 hours. The gas is made from oil, and is reported to have only a feeble tendency to explode when mixed with atmospheric air. It is stated that it will furnish, when employed with an inverted incandescent gas-burner, a "beautiful light;" and it is already in considerable use for illuminating purposes.

SCOTTISH JUNIOR GAS ASSOCIATION.

Eastern District.

A Quarterly Meeting of the Scottish Junior Gas Association, Eastern District, was held in the Heriot-Watt College, Edinburgh, last Saturday afternoon—Mr. A. MASTERTON, the President, in the chair. There was a very good attendance.

The PRESIDENT, in welcoming the members, said he wished to call their attention to the question-box, which, owing to hurry, was overlooked at the preceding meeting. He might say that all questions soliciting answers would be attended to, and information given at their gathering in July. He would now introduce Mr. Webster, one of the principal draughtsmen at the Granton Gas-Works, who had made a special study of hydraulics, and, therefore, was highly qualified to speak with authority on the subject.

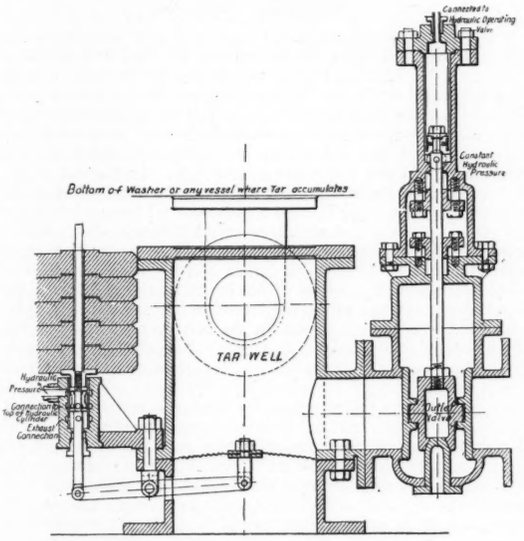
HYDRAULICS AS APPLIED AT PRESENT IN MODERN GAS-WORKS, AND THEIR FUTURE POSSIBLE APPLICATION.

Mr. RICHARD WEBSTER, draughtsman at the Granton Gas-Works, read a paper on this matter, in the course of which he said he had chosen the subject as being, he thought, out of the ordinary run of theses delivered at Association meetings. At the same time, in these days of labour-saving appliances, no up-to-date works, from the medium-sized to the largest, would be considered complete without a hydraulic installation. They would probably agree with him when he said that, in some respects at all events, the gas-works of Great Britain were not behind those of other countries in obtaining and using a number of labour-saving arrangements. It could not be too strongly impressed upon them that, when several such appliances could be procured, it was of importance to find out the machine for doing the particular work most cheaply; and if it were not obtainable, the next best thing was to have a machine designed and manufactured for the purpose. He would go so far as to assert that hydraulic power was the best for these purposes in gas-works. In fact, he would go even further, and say that for any work that required a machine of direct-acting type to save labour, hydraulic power could not be surpassed as regarded simplicity, economy, or less liability to break down. He did not touch the question of rotary machines (except capstans, which were intermittent rotary types); but speaking generally, hydraulic power was not very suitable for continuous rotary motion.

In a hydraulic installation, the prime mover could be of much smaller capacity than in cases where shafted and geared machines were employed to do direct-acting work. The machines might be placed in any position where they could be most usefully employed—mains being taken to them from the accumulator, which stored up the motion. There was no vibration from the appliances; no heavy buildings were required to carry shafting; no head-room was required for pulleys; and there was no danger from belting, &c. The parts of a hydraulic machine were few and simple, and power was only utilized when doing the work. In using geared machines, there was a tendency to put them in line, to suit the shafting, irrespective of the disadvantage to the work to be done; whereas, with hydraulic power, the machines might be situated where they would best serve the purpose. The hydraulic power usually employed in gas-works was 750 lbs. per square inch. In the event of a case arising in which it was desired to use a higher pressure—even to 2 tons per square inch—for the sake of keeping down the size of any particular machine, the pressure could easily be increased for it by the adoption of an intensifier. His experience was that at the present time it was not actually necessary to use an intensifier in gas-works; but it was quite possible in the future it would be. The loss incurred through friction in a hydraulic installation was a comparatively small item. For instance, at the Granton works there were hydraulic machines 500 yards away from the prime mover and accumulator; and the loss through the pipes was infinitesimal, amounting only to a few pounds per square inch, so that gas-works which covered a wide area presented no limit to the economical transmission and application of power by water. The motive power for hydraulic machines would be the steam or the gas engine, in some form or other, driving pumps either through shafting and pulleys, or electric motor and pumping-engines put down expressly for the hydraulic plant. The favourite form of pumping-engine, where the duty was likely to be intermittent, was the duplex. This type was inexpensive, required little foundation, and for medium-sized plants was generally adopted.

Having described the working of accumulators for the storing of energy, the author proceeded to say that the first hydraulic machine used in the ordinary process of a gas-works, apart from the motive power machines, was the hydraulic capstan, which was used for pulling the waggons up to the coal-breakers. These were made in various forms; but the one he would recommend was the three-cylinder turn-over type, which lent itself to perfect balancing, and was easily repaired. The next machine in the series, and which came in close proximity to the capstan, was the coal-waggon tipping-ram. The only part of this machine projecting above the ground was the removable cast-steel fork end, which engaged the hind axle of the waggon; the other part of the machine being below ground. The gross weight of the largest coal-waggon dealt

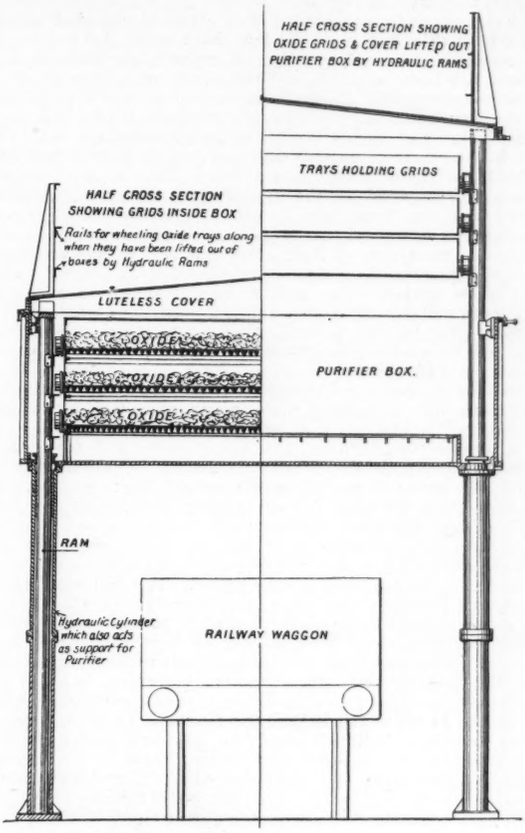
with was 25 tons; and the ram must be of sufficient area to lift half this weight—viz., 12½ tons. The size of the ram used at the Granton works was 7½ inches diameter, equal to an area of 44 square inches; and if this were multiplied by 750 lbs. per square inch, they arrived at a total power exerted by the water of 33,000 lbs. As 12½ tons was equivalent to 28,000 lbs., the efficiency of the ram was about 90 per cent., which was the efficiency generally allowed for direct-acting rams by hydraulic engineers. In houses fitted with inclined retorts, very little hydraulic machinery was required. The only machines really used were the hydraulic rams operating the coal-measuring boxes above each set of mouthpieces. For charging and drawing machines, he believed that hydraulic operated machines were superior to geared, electrically driven, or pneumatic ones. No hydraulic machinery was applied to the exhausters; but perhaps a hydraulic arrangement might be connected up to the compensator and the throttle-valve of the steam-engine, so as to effect a more gradual opening and closing of the steam throttle-valve, according to the make of gas. What he meant was that, by the use of hydraulic power, something might be instituted to give more sensitive working. As to the washers, he should make a suggestion. He had often wondered whether, instead of a man coming along now and again to open the tar-cock, it could not be discharged automatically. For the purpose of having this discussed, he exhibited a drawing of an arrangement which he had called an automatic self-emptying tar-well, which was worked by hydraulics.



HYDRAULIC SELF-EMPTYING TAR-WELL.

The illustration shows a vessel which was connected at its top end to the bottom of the gas-washer. Supposing it discharged the liquor from it, and became filled with tar, the specific gravity of which was more than liquor, and, for the purpose of the argument, say the vessel was of the capacity of 1 cubic foot, when this amount of tar was reached the apparatus was so balanced that the flexible bottom would fall and move the tiny hydraulic piston (which was in equilibrium) upwards, and thus allow the hydraulic cylinder above the 6-inch double-faced valve to exhaust, &c. The constant pressure at the bottom of the piston would at once open the valve, and allow the tar to flow out. When the tar had been all discharged, the flexible bottom would fall back into its place, pull down the tiny hydraulic valve, and admit pressure to the top of the hydraulic cylinder above the 6-inch double-faced valve which would at once close, and remain so until another accumulation of tar took place.

At the time the Provan Gas-Works were opened, he noticed an item that quite took his fancy. This was the means of raising the purifier-covers by hydraulic power; but he did not think the idea had been carried far enough. He had schemed out a hydraulic method, and showed a drawing of it. This idea was to raise the oxide grids as well as the covers; and when he stated that he could empty and refill a large purifier of oxide in (say) ten minutes, with the assistance of two men, they might feel inclined to doubt it. The object of his scheme was the saving of labour and space, and the quick manipulation of the purifying material used. To do this, he provided the inside of the purifiers with (say) three tiers of grids. These grids were furnished with trolley wheels, which rested upon rails or girders at opposite sides of the purifier-boxes, and which were attached to hydraulic rams that worked through the bottom of the purifier-box, at each side, and also acted as supports for the purifiers. When it was desired to renew or revivify the purifying material on the grids, pressure was put on the rams, giving them an upward motion; the cover of the purifiers and the tiers of grids being elevated so that the bottom of the lowest grid had cleared the top of the


HALF CROSS SECTION SHOWING OXIDE GRIDS & COVER LIFTED OUT PURIFIER BOX BY HYDRAULIC RAMS
TRAYS HOLDING GRIDS
HALF CROSS SECTION SHOWING GRIDS INSIDE BOX
Rails for wheeling Oxide trays along when they have been lifted out of boxes by Hydraulic Rams
LUTELESS COVER
OXIDE
OXIDE
OXIDE
PURIFIER BOX.
RAM
Hydraulic Cylinder which also acts as support for Purifier
RAILWAY WAGGON

NEW PURIFIER AND SYSTEM OF OPERATING.

purifying-box. The grids were then ready to be wheeled along the top of the cover of the next purifying-box. Should the purifying material be entirely spent, it could be emptied into waggons which ran under the purifier-boxes. Should the purifying material be not entirely spent, the grids could be wheeled along the tops of the covers of the adjoining purifier-boxes, and the material revivified in those positions without being taken off the grids; or even if it were desired to take the material off the grids, why not utilize the tops of the other purifiers for revivifying? Or, in these days of revivifying by forcing air through the oxide, why not use a separate purifier for this purpose, which he should call an air-box, of exactly the same size as a purifier itself? The grids holding the material to be revivified would then be simply wheeled on to the rails or girders attached to the moving rams of the air-box, and then lowered into it. To take the place of the grids which had been removed from the gas purifying box for the purpose of revivifying them, either in the open-air or in the air-box, a spare set of grids, filled with revivified or new oxide, would be kept in readiness to be wheeled over the empty box and dropped into it.

In regard to the covers of luteless purifiers, he had seen many patented devices for making the joints between the box and the cover—such as renewable rubber pads and so forth—but he found no reason why a perfect joint should not be made by laying a flexible rubber tube into a groove formed on the top of the purifier-box, and a similar groove in the cover, to fit on top of the flexible tube. Then, when the joint was made, inflate the rubber tube with (say) a hydraulic pressure equal to 50 lbs. per square inch. This, he thought, would make a perfectly tight and safe joint. At first sight, it might seem that this was an expensive form of purifier; but when the fact was taken into consideration that the whole of the elaborate overhead structure could be done away with, and the cranes for lifting the covers also dispensed with, to say nothing of the amount of wages saved in labour per year, for their manipulation and working, it really looked as if the idea were worthy of consideration at the hands of those allied with the gas industry.

Discussion.

The PRESIDENT, in inviting discussion, said they were all delighted to see Mr. Wilson, the Engineer and Manager of the Glasgow gas undertaking, with them, and would be pleased if he would favour them with his views on some of the points touched upon by Mr. Webster.

Mr. A. WILSON (Glasgow), before expressing any opinion upon the paper, said he was very glad to find that a visit to Edinburgh would fit in with the meeting, because he took a great interest in the Association. In Glasgow they had been doing good work during the winter, and if the paper which had been read was a

sample of what had been done in the East, he did not think they had any reason to be ashamed of it. He was very glad indeed to have been able to help in the launching of the Association, and in getting it into working order. Coming to the elaborate paper which had been read, he said the points in it were almost too numerous for proper discussion in the time at their disposal. One of the first the reader made was the reliability of hydraulic power. He (Mr. Wilson) did not think there was the slightest doubt about this in the minds of anyone who had had to do with hydraulics. He was early connected with works in London in which hydraulic power was installed for the unloading of vessels with coal that came from the Tyne, and he gained a rather wide experience there which had stood him in good stead ever since. The use of hydraulic machinery at Nine Elms and at Vauxhall was a great factor in their working; and the reliability of the power employed was quite settled. The author thought hydraulic power was not quite suitable for rotary motors, with the exception of the capstan; but he (Mr. Wilson) could assure the members that in Glasgow they were using hydraulic motors for several arrangements as well as with capstans. They were employing it as a motor for driving some elevators, as well as in the Arrol-Foulis machines for propelling them along the floor. The latest apparatus for this purpose was a rotary hydraulic motor; and it gave every satisfaction. One point in particular was that it required very little for its upkeep. In the gas-works, they used hydraulic power at pressures of from 450 lbs. to 500 lbs. This enabled them to have larger moving parts, with the consequence that the wear and tear was lighter. As to pneumatic machines, they knew those of Mr. West did very good work. Where pneumatic power was properly used, it was quite as serviceable, in its way, as hydraulic power. The author referred to packing. Certainly this was a most important point. On it the general opinion seemed to be that while there were all sorts of fancy packings, there was nothing to beat tallow and hemp, especially where leathers could not be used satisfactorily. Regarding the throttle-valve for exhausters, of course, in all of them hydraulic power was used, to form a sort of buffer arrangement, so as not to allow the bell of the governor to act too quickly. With regard to hydraulic rams, he was very glad to hear the Glasgow system criticized; and perhaps some of the ideas proposed would remain. He could assure the reader of the paper that they had little trouble with the leathers inside the rams. A handyman and a labourer could change one of them in about three-quarters of an hour. It was not the case that there was much wear and tear of the leathers—they went for years, and gave little trouble. The appliance to the purifier-boxes was a novel idea; but he could see some objections to it. However, he was glad to see new ideas brought forward, as this was what had been wanted for a long time in the Senior Associations.

The PRESIDENT said Mr. Webster had chosen an appropriate subject, which had been little considered or discussed at Association meetings. He had referred to the closest competitor with hydraulic power, at least from a gas-works point of view—namely, compressed air. It would have been interesting if he could have supplied information regarding costs, under which he included both the initial outlay and the expense of working, maintenance, &c.; because, for many purposes in a gas-works, he was inclined to think it just possible that compressed air might have the advantage over hydraulic power. They must not allow themselves to be prejudiced in favour of one power, without knowing all the possibilities of the other. Again, the question arose as to what capacity a works must be to put down an installation of hydraulic machinery and make it pay. They would all find it valuable and interesting if Mr. Webster would give them his views on the relative advantages of overhead and underground water-tanks for the supply of hydraulic pumps, and also inform them what quantity of water could be recovered under the best conditions—that was to say, the maximum amount of water that would be required for working purposes. With regard to future applications of hydraulic power, he might be permitted to say, without in any way decrying the merits of Mr. Webster's suggestions, that he did not consider they would find in hydraulic power any advantage over the present system of controlling the engines attached to the gas-exhausting machinery, for the reason that such machinery was at present regulated by the pressure of the gas itself, and any improvements in this direction would, in his opinion, best be attained by improving the mechanism. There appeared, at first sight, to be something in the novel proposals regarding the purifying apparatus. He was inclined to think that the capital outlay would be greatly increased, and also that with so large a number of moving parts there would be the greater risk of a breakdown; and then it would be necessary to have a substitute in case of accident. It should likewise be borne in mind that oxide of iron was revivified best and most quickly when spread out in thin layers, turned over repeatedly; and the depth of the material, as ordinarily used, would render the proposed process very slow. Then they knew that the cost of purification with oxide, when economically carried out, was exceptionally small; and it became a question whether the extra capital outlay would not more than balance any advantages that might accrue.

Mr. WEBSTER, in replying upon the discussion, pointed out that he recognized that hydraulic power was suitable for intermittent rotary machines, and that the driving of Arrol-Foulis stoking-machines was really an intermittent motion. What he meant was that hydraulic machines were not suitable for running, like geared shafting, all day long. He did not mean to imply that leather packing would not work; he wanted to show that, on the principle of construction, internal packing was bad. He wished to impress upon them to endeavour to have external packing. As to initial outlay and the expense of working and maintenance, he must admit that he had not gone into the relative costs; but no shadow of doubt existed in his mind of the benefits, both in regard to initial cost and the cost of work and maintenance, as regarded hydraulic working. It was rather difficult to state what size of works would be suitable for hydraulic power, but he would say towns about the size of Ayr or Alloa. Wherever it paid to put in stoking machinery, it would pay to put in hydraulic machinery. So that works having a make of about 50 millions a year, such as Musselburgh, would be the minimum. As a rule, tanks were put overhead; and he should say they would recover about 90 per cent. of the total quantity of water. As to the exhausters, he had shown a form of mechanism, in the automatic tar discharger, where, by the introduction of hydraulics, he made it more sensitive. He did not think there was any possible question of the breakdown of the purifier plant, seeing that it was its safety that was the great thing with hydraulic machinery. In fact, the overhead structures now employed for raising covers were far more liable to break down than the appliance shown, because they were generally geared; but, as this was a hydraulic operating machine, there was no possibility of such an accident.

DOMESTIC LIGHTING.

Mr. W. BROWN (Lasswade) read a paper bearing the above title. He wished, he said, to submit for their information and criticism a few facts in regard to lighting by means of paraffin oil, electricity, and coal gas. The particulars he gave were primarily obtained for his own benefit, as he felt he was not always ready off-hand to reply to various statements that were made regarding paraffin oil and electricity in contrast to the commodity in which most of them were interested—gas. In regard to paraffin oil, he had had three different lamps under trial—round, double, and single wicks. He bought a gallon of oil for each lamp, at 8d. per gallon. The round wick consumed the gallon in 26 hours, and gave a light equal to about 45 candles per hour; the cost for a year's burning of (say) 2400 hours being £3 1s. 6d. The double wick consumed the gallon of oil in 50 hours, yielding a light of about 23·73 candles, at a yearly cost of £1 12s. The single wick exhausted the gallon of oil in 80 hours, producing a light of 21·1 candles, at a yearly cost of 20s. The costs of lamps, wicks, and globes were not included in these figures. As to electricity, it was an undoubted fact that, light for light, it was much dearer than gas. In the "Encyclopædia Britannica" it was stated that a Board of Trade unit of electricity would maintain an average 16-candle lamp burning for 18 hours, and that it would require two 16-candle electric lamps to yield a good illumination per 100 square feet of floor space. To light up a room of that size would take 133 Board of Trade units in a year's burning of 2400 hours, which, at 4d. per unit, would cost £2 4s.; whereas, putting in an incandescent gas-burner to consume 3 cubic feet of gas per hour, the annual cost, with gas at 3s. per 1000 cubic feet, would be about 19s. But supposing they took it light for light, the costs would be: With electricity at 3d. per unit, £6 15s.; at 4d. per unit, £9; and at 5d. per unit, £11 5s. So that electricity had not much chance with gas, so far as cost was concerned.

Reviewing some of the ways of obtaining the best and cheapest light from gas, he thought it would not be out of place to refer to their old friend the flat-flame burner; for in country places it had still a good hold upon the people. It was generally admitted that the flat-flame burner was extravagant, expensive, and antiquated; but, at the same time, if properly used, it was wonderful the amount of light that could be obtained from it. He calculated that the average annual cost for 2400 hours' burning with a good flat-flame burner would be about £2 2s., with gas at 3s. 6d. per 1000 cubic feet. But the incandescent light was undoubtedly of most vital consideration to the gas manager.

After dealing with the construction of burners and the quality of mantles, Mr. Brown said everything hinged upon the proper mixing of gas and air so as to produce a bluish green flame. Suitable burners, along with good mantles, would yield, on an average, a light of some 80 to 100 candles, burning about 4 cubic feet of gas per hour; and with gas at 3s. per 1000 cubic feet, the cost of a year's burning (2400 hours) would be £1 8s. 10d. With gas at 3s. 6d., it would be £1 13s. 7d.; and with gas at 4s. 2d., it would be £2—or an average of £1 14s. 1d. For a similar number of hours' burning with oil-lamps, as already mentioned, the cost would be £1 17s. 10d.—or a gain for gas of 3s. 9d.; while the average candle power for the oil-lamp would be 36·61, and for gas 60—a benefit for gas of 23·39 candles. Taking electricity light for light, the cost would be, on an average, £9, or a saving with gas to the extent of £7 5s. 11d.; so that they deduced that with incandescent burners and mantles there was nothing to fear from their younger rivals, so far as cost was concerned. Most of these figures had been ascertained by actual experience.

Discussion.

Mr. J. SCOTT (Edinburgh) said he had expected Mr. Brown would have given them a few more figures. He had referred to getting burners which passed from 8 to 9 cubic feet of gas per

hour. Well, he had a good many burners go through his hands, but he never had one which passed anything like this quantity of gas, at ordinary pressure.

Mr. H. RULE (Falkirk) expressed the opinion that the paper confirmed the view that gas companies and corporations should pay more attention to lighting. If they could satisfy their consumers as to the light they could give, it would make gas much more popular. By using economizers they reduced the pressure of the gas after it had passed through the burners, and they got a better light—not so much because more gas was burned, but because the pressure was reduced.

Mr. J. MILLER (Edinburgh) thought Mr. Brown would have given the members some ideas as to the different methods of lighting, and comparisons between flat-flame and incandescent burners. In his opinion, the day was not far distant when gas companies and corporations would undertake to supply incandescent burners as well as mantles. In some towns in Germany the percentage was 98 incandescent to 2 flat-flame burners. He asked Mr. Brown if he had ever tried adjustable burners, which, he said, gave very good results.

Mr. T. O'NEIL (Dunbar) considered the burners were not always at fault, but that the disposition of the lights was. Architects seemed to be doing away with gaseliers; and if people wanted to read over the fire, they could not get a light at all. In his experience, on account of this and the colour of wall papers, many persons had had to resort to reading-lamps. As regarded inverted incandescent gas-burners, he found that after having been in use for a short time they became choked up with soot; and adjustable burners smoked a good deal.

Mr. A. WILSON said for a long time they had been striving in gas-works to bring down the cost of gas, and they had succeeded fairly well. The other side of the table as it were—the commercial department—had now to take up its share of the business, and sell the cheap gas. They seemed to be only just awakening to the fact that they had great possibilities in this direction. They ought to see that they got a good share of the business that was going. The best way to do this was to get primed up to the muzzle with facts and figures, and endeavour either to get new consumers or to retain those who were going over to their competitors, or to get back those who had gone over. It lay with the commercial department to educate the public as to what they could do for them. The discussion they had had about burners pointed to the necessity, he thought, of bringing down the quality of the gas. There was no mistake about it, that the real cure for all troubles and complaints was to sell a lower quality gas. His experience had always been that where a 16 or 18 candle gas was supplied, there were not one-tenth of the complaints they had with 20 or 25 candle gas. He was sure that they had more complaints in Edinburgh, where they supplied 25-candle gas, than they had in Glasgow, where the gas was 20-candle power; and that when they went down to 16 candles in Glasgow, they would have far fewer complaints than at present. Speaking from experience, he said that 16-candle gas was more suitable for all classes of consumers than a higher illuminating power; and the sooner the quality of gas was reduced over all the towns of Scotland, the better it would be for the consumers, as well as for the gas companies and corporations. They had heard about economizers. The same thing held good there. They could not burn a high-quality gas with the same advantage as they could one of low quality. It was equally so with incandescent burners. The great difficulty with high-quality gas was to get the proper mixture of gas and air; and this was not nearly so difficult to regulate with a gas of low quality. They had all a big battle in front of them; and if they were going to hold their own, they must work up their facts and educate the public by papers such as the one before them.

The PRESIDENT said he thought that if Mr. Brown had favoured them with the cost of wicks and globes for the oil-lamps, the cost of lamps for the electric light to maintain the illuminating power at 16 candles, and for gas the cost of mantles and cleaning burners, so that the light would never be below 16 candles, it would have placed in a better position the question whether, after all, the incandescent mantle was really so expensive an article as was asserted by some—or the opposite. In former times, the rough-and-ready method of arriving at the relative cost of gas and electricity was to take the number of pence charged for a unit, and, reckoning them as shillings, to say that electricity at (say) 4d. per unit was equivalent to gas at 4s. per 1000 cubic feet. A more exact calculation, however, would show the great difference there was in the relative costs of the two systems of lighting. If they took the charge for electric light as at present in Edinburgh, 3¼d. per unit, which would light a 16-candle power lamp for 15½ hours, and then took an incandescent burner consuming 3 cubic feet of gas per hour, and yielding an illuminating power of not less than four times the 16-candle power electric lamp, the incandescent burner would, in 15½ hours, consume 46½ cubic feet of gas, which, at 2s. 9d. per 1000 cubic feet (which was the current price in Edinburgh), would cost 1¼d., or a fraction less than half the cost of electricity, with the additional benefit of at least four times more light. Mr. Brown affirmed that the average cost for 2400 hours' consumption with a good flat-flame burner would be about £2 2s. with gas at 3s. 6d. per 1000 cubic feet. This represented a consumption of 5 cubic feet of gas per hour. But the same illuminating power could not be obtained from this burner at such a rate, if the gas were burned in an ordinary house, as could be obtained from 5 cubic feet of gas in the photometer-room, where the flame was protected from draughts, and the gas issued from the special burner at a pressure of 5-10ths—a pressure, by the way, quite inadequate to supply even the smallest village with any satisfaction. This burner, tested in the photometer-room, would give 25 candles; but, under ordinary conditions, with the addition of using it under a necessarily augmented pressure, the illuminating power would be considerably reduced, and in many cases might lose nearly one-half its efficiency.

Mr. BROWN, in reply, said the economizers he referred to were articles which were hawked about his district a few months ago. They were sold at 6d. each. Some of them were brought to him to be tested, and he found they passed 10, 12, and 14 cubic feet of gas.

A vote of thanks was accorded to the readers of the papers.

SCOTTISH JUNIOR GAS ASSOCIATION.

Western District.

At the Meeting of this Association on Saturday week (some of the proceedings at which were reported last Tuesday, p. 836), one of the papers read was entitled "The Gas-Stove Department: Its Past and Future."

The author (Mr. J. M. Maconochie, of Glasgow) said that to the late Mr. Foulis was due the creation of the stove department in Glasgow. He was always anxious to develop anything that would create a market for gas during the day, and especially in the summer time. Mr. Foulis inspired the first Convener of the Stoves Committee (Dr. Crawford) with his ideas, and he brought the matter before the Gas Committee, who, after much discussion and opposition, appointed a deputation to visit Leeds, Bradford, and London, where developments, particularly in London, had been made in cooking and heating by gas. They returned with a favourable report, which was laid before the Town Council and adopted. The fittting-up question proved an obstacle in Committee for a time; and ultimately it was resolved to fit at the Corporation expense only goods hired out. After getting along so far, Dr. Crawford called upon the then Lord Provost (Sir William M'Onie), and told him all that had been decided upon. The Lord Provost, in his genial Doric, said seriously: "God bless me, you'll shairly no' ha'e meat cooked wi' gas. It'll smell, man; it'll pooshin you"—a remark which showed that even a belted knight had limited knowledge, at that time, of the great future. Everything went well, and the proposition for a show-room in an apartment of the offices at No. 42, Virginia Street was approved of; and with a view to reconciling the opposition party, an enticing but modest menu was presented. It was plain roast beef and boiled potatoes, cooked on the spot; and with a few bottles of champagne they all enjoyed a delightful "al fresco." The praises of the Stove Department were sung, and its fame spread far and wide. Such was the brief history of the creation of a department before which many obstacles were placed in its journey. From May 1, 1885—the date of its inception—till Dec. 31, 1885 (eight months), 2456 stoves were hired out. Owing to other calls, the Convener was obliged to cease taking an active interest in the nursing of the Gas Department's baby. The infant went back in health; and the next twelvemonth only 2287 stoves were sent out. For some time the department remained a baby in long clothes. With the advent of Bailie P. G. Stewart, it might be said to have cut its wisdom teeth. Increased business followed; but it was not until 1891 that the department equalled in output that of the first eight months.

The door of the stove department had hitherto only remained ajar to the great gas consuming constituency of Greater Glasgow—a constituency with the persistency of an Oliver Twist, asking for more economy, cleanliness, and pure air. With new men came new manners; and he believed that when Mr. Wilson saw his way to fling open wide the doors of the Gas-Stove Department, a great and lasting impetus would be given to it, and the gas industry of Glasgow and district would receive an enormous fillip. With the view of bringing grist to the mill, the Corporation established half-a-dozen branches in various parts of the city. He was afraid that these were show-rooms in name only. It might be bold on his part to mention it, but it was his strong conviction that until their branches were better distributed, and made genuine places of business, where all accounts for certain areas could be paid, and the public be thus induced to come in and see the latest creations of the gas world, the branches would remain pretty much what they have been—dull, uncommercial spots. Attractive places, with the sound of the beehive hum about them, were always magnetic. He sometimes thought that the outdoor collection of gas accounts was overdone. Taking payment of a gas account at the stair-head did not create a lively or healthy interest in the Gas-Stove Department. An acquaintance was much desired with the beauties of the department. Collectors could look after laggards; and he ventured to say that they would be few. Every master plumber and gas-fitter, many of whom had no accommodation for a stock, nor the capital to invest in the same, could, with advantage, be invited to bring his customers to their show-rooms—and they could afford to sacrifice some of their profit in favour of the master fitter, in the event of a purchase; for, after all, it was gas they wanted to sell.

Much could be said for and against the subject of free stoves. After twenty years dealing with the public, he could testify to the strong desire of the community to have the stoves as private property. He was an advocate of securing permanent consumers of gas by dealing more generously with the public in respect of the cost price of the stove having been paid by a hirer; then the stove ought to pass from the Corporation to the consumer. With this there would be a saving, and latterly complete relief from maintenance, with a decreasing scrap heap, and satisfaction given all round. Consumers had more right to the stove which they had paid for—in many cases two or three times over—than they had to the meter, which they did not pay for. Hired stoves, when a year or two out, could be offered for sale by intimating the balance due. This would not only be a return of a proportion of the Corporation's capital expenditure, but a saving of interest and sinking fund, and of repairs and maintenance; exchanges demanded by the consumer would be avoided; and the Corporation would secure permanent consumers. He made a rough calculation, which showed that somewhere about 10,000 stoves at present on hire could be sold, with advantage to Corporation and public alike.

Should gas-stoves be hired? On this subject he was a "whole hogger." The trade did not cultivate a close acquaintance with the gas industry fifteen or twenty years ago, until they began to waken the public, and interest them in gas cooking and heating. The trade grumbled when they ought to rejoice, seeing that their own mill-wheels had been made to grind more corn since the Corporation began to hire stoves and to sell other appliances. The hiring of gas-fires, or, better still, the sale of them on the hire-purchase system, was the trump card in the Corporation's hands. When they would play it, he did not know. Slot meters, with free stoves, would reach a particular constituency not yet tapped, so far as cooking by gas was concerned. It was some years since he advocated a pattern stove of several sizes. He thought it should prove a great advantage to have a model cooker of different sizes, for the supply of which various manufacturers could tender. For the Stove Department there was a big tide about due; and they must be prepared to take it at the flood.

The PRESIDENT (Mr. James Lowe), in asking the members to give Mr. Maconochie a vote of thanks, remarked that he had made a great number of interesting suggestions.

Mr. J. SMITH (Glasgow) agreed with the author that a pattern stove ought to be adopted. The public, however, must be approached, and educated as to the best method of consuming gas. Personally, he favoured a system whereby stoves would be sold at cost price, and paid for by combining the sale and hire.

Mr. R. SHEPHERD (Glasgow) urged that more attention should be paid to range fittings, which, he pointed out, were a Glasgow invention. People in Glasgow had no room for gas-stoves. They wanted something which would stand on the top of a range. They supplied nearly three range fittings for one stove.

Mr. J. DEWAR thought there was a quite evident hesitation on the part of the public in the matter of their being handed over to the plumbers at the period when the stoves would come into their own hands. They seemed to believe more in the capacity of the Corporation workmen in attending to repairs. Many of them would pay off the price of a stove in two years, if maintenance were added. About 90 per cent. of the houses in Glasgow were two-roomed; and there was no space for stoves—in many of them not even for range fittings.

Other gentlemen spoke to the same effect; the discussion being more on details than on general principles.

GAS BUSINESS TOPICS IN AMERICA.

At the Fourth Annual Meeting of the Wisconsin Gas Association, recently held at Milwaukee, under the presidency of Mr. E. G. PRATT, of that city, two of the papers submitted dealt with the business side of the gas industry.

Mr. D. DOUGLAS (Eau Claire) read a paper entitled

SOME COMMERCIAL PROBLEMS OF A GAS BUSINESS.

The author began by pointing out that nearly a hundred years ago, when the gas companies were first organized in England, they generally selected the title of "Gas Light and Coke Company;" and the name indicated the nature of the business they intended to follow. They proposed to manufacture and sell gas for light, and also coke. At that time there was no thought of fuel gas. There had been a change of thought in later years, when companies selected the simpler title of "Gas Company," or "Gas Light Company," leaving out the word "Coke." In this change of name, the intention appeared to be to say that the manufacture and sale of gas indicated the business intended to be pursued, and that if any coke were made it would be as a residual or bye-product. The question he desired especially to bring before the meeting for discussion was whether the commercial conditions now existing were not driving us back to the original attitude of gas companies, and that we ought to look upon the coke manufactured as a primary product, and not merely as a residual. He then proceeded as follows.

Coke.—During the past few years, we have seen the organization of companies to make coke as their only primary product; and they, in turn, have classed the gas as a residual or bye-product. I am not referring to coke companies operating in the coke districts, and producing chiefly hard coke for smelting purposes, but to such companies as have started plants in Milwaukee and in Duluth, with the avowed intention of manufacturing coke for domestic purposes and of disposing of the gas at any price it may bring in the market, or blow it away to get rid of the surplus. Surely this is turning the tables on us with a vengeance. It is not my intention to discuss whether or not such coke companies can operate with profit, but the basic thought of their business is that the coke made from a ton of coal is worth more commercially than the coal from which it is made; and I am of opinion that they are correct in this view.

Eau Claire may be fairly typical of many cities in Wisconsin; and here we find the cost price of a ton of anthracite more than twice that of a fairly good bituminous coal, and the retail delivered price of anthracite just about double. If anthracite is worth $9·50 per ton and bituminous coal $4·75 per ton delivered, what ought to be the price of gas coke? I think I hear someone say: "The price for gas coke will be just what you can get for it;" and he is right. But that does not answer the question, "What ought we to get?" Coke must have some relative value in the market as compared with anthracite and other fuels; and it is our business to ascertain what that value is, and then do all in our power to get the price our product is entitled to.

My impression is that the question may be simplified by comparing the relative merits of coke and anthracite. They are about equal in calorific power, and both are smokeless. Anthracite is twice as heavy as coke, and requires less space to store it. A fire fed with the same bulk of anthracite as of coke will last twice as long as a coke fire, and therefore requires less attention. Coke will, however, burn with less draught; it is easier kindled; a hotter fire can be obtained with it in less time than with anthracite, and the fire can be regulated easily to any required temperature by simple manipulation. Coke is in every respect the equal of anthracite except in the one qualification of weight. Surely, if we should make an allowance of 20 per cent. difference in value in favour of anthracite, it should be ample. If, therefore, anthracite is worth $9·50 per ton, coke should be worth $7·50 per ton; and it is my business to get that price if I can, and not be content to dispose of it at any price I can get for it as a residual which must be disposed of.

At Eau Claire, we built in 1901 a coal-gas plant. Prior to that we had been making water gas and buying coke instead of having coke for sale. As no coke had been on the market for many years, there was no demand for it. The majority of the people did not know what gas coke was; and it was our business to educate them, and make a market for what we then called our most important residual. We had to sell it at some figure, even if we had to take less than the price of butuminous coal for it. I will not weary you with the details of hunting for customers; but we did hunt, not only in the city of Eau Claire, but also in Chippewa Falls and all the neighbouring cities, and by hard work managed to dispose of it at very low prices. The coal strike of 1902 helped us out that year; but we were one of the few companies who had coke left for dispatch by rail to other cities. In 1903, we took the precaution of selling a considerable quantity of our coke under contract to large consumers, with the result that we ran short of stock in February and March, and had to turn away orders from people who were beginning to appreciate its merits. Towards the close of 1904, we determined that it would be good policy to arrange to build up the demand for coke in the city, without regard to our own limited production. We would sell all the coke we could, and if we should run short in our own town, we would buy from other places to supply our local market. We reasoned that by this policy we should be sure of getting the market price for the coke we ourselves made, and we could not expect at any time to do better than that. We spent some money in advertising and canvassing, and already we have purchased about 300 tons of coke ourselves, and have sent at least one coal merchant into the coke business. Our canvassers say they can sell next season 1000 tons of coke more than we shall make; so we are sure of the market price for our own. But, strange to say, we are not going to be content with this. We are not satisfied with selling our own coke at the price at which the product can be purchased in other cities (where it is looked upon as a residual) *plus* the freight and other charges. We think coke is worth more as a fuel relatively than it is being sold for; and with concerted action on the part of all the gas and coke companies of the State to educate fuel users to the true value of our goods, we think we shall be able to obtain higher prices for our coke in a natural and legitimate manner.

Our methods of working up the demand are manifold. Newspaper advertisements do a lot of good. They attract attention and awaken inquiry; but we depend most upon personal canvassing to obtain the business. When we hear of any building from which complaints are made that they are insufficiently heated, they are our sure meat. When soft coal and hard wood and anthracite all have failed to heat a building, we find we can do it successfully with coke; and at a saving of expense. The first question which every new consumer asks is: "Can I use it in my particular fire or furnace at all?" We inform him that we have a man skilled in furnace work and in the use of coke, and will send him to make an investigation and report upon the matter direct. As a rule, nothing is seriously wrong with the appliances,

although in some few instances we have recommended and made changes of grates and minor alterations with much advantage. The same expert will build the first coke fire and watch its operation, will explain what to do, and pay as many subsequent visits as may be necessary to educate the party attending to the fires as to how to use coke with advantage. Janitors of buildings quickly fall in love with coke as a fuel. If they have been using soft coal, they find they no longer have the daily irksome and dirty duty of cleaning boiler-flues. If they have been using wood, they have only half the attention to give to the furnace; and the occupiers find they have a steady and satisfactory temperature instead of an erratic and an often insufficient one. We hear the statement made every day: "Coke is the only fuel; we will never use anything else again." Every customer of this kind becomes a canvasser of the best sort; and as the demand for coke increases, there will be a tendency towards a rise in its market value.

Tar.—If a gas company are to regard gas and coke as primary products, they may still have to look upon tar and ammonia as residuals. The present existing depressed condition of the tar market has been a source of much anxiety to every gas manager. Everybody is asking, "What shall we do with our tar?" I do not think it is necessary to go into all the details of the tar market; but it must be evident to all that the low price of tar prevails because the supply exceeds the demand. We must not forget that tar still has value as a fuel, when all other demands for it cease. Its value as a fuel is also relative to the cost of other fuels in the same market. If bituminous coal is worth $4 per ton, What is the value of a ton of tar? I have had very little experience in burning tar under retort-benches; but some have claimed that a ton of tar is approximately equal to 1½ tons of coal. If this be so, then a ton of tar compared with coal at $4 per ton should be worth $6; and as we know that the buyer gets at least 10 lbs. of tar for every gallon sold to him, we may reckon 200 gallons to the ton, and under such conditions the tar is worth 3 c. per gallon to the gas company. I know of some managers who have been selling tar at 2 c. per gallon and even less; but surely they have been blind to their own interests. To burn tar because it is profitable to do so is a good business reason; and if denuding the market in this way ultimately stiffens the price, we shall have gained a double advantage. My advice, therefore, is to burn the tar unless you can get a higher price than it is worth to you as a fuel.

Ammonia.—The only other product to consider is the ammonia. In gas-works carbonizing less than 2000 tons of coal per annum, it is debateable whether at present prices it pays to save and concentrate the ammonia. In larger works there is a profit which I have seen estimated at from 15 c. to 35 c. per ton of coal carbonized. The profit seems to depend largely upon how the account is figured out. We know, however, that to save 5 lbs. of ammonia per ton of coal carbonized is a practical figure, and that it is worth, in concentrated form, at Detroit, about 9 c. per pound, which is is a gross income of 45 c. per ton of coal. Allowing reasonable charges for operation and maintenance of the concentration plant and freight charges on the liquor, it seems that a net profit of 25 c. per ton of coal might be made from the ammonia.

Drawing all these points together, let us see how they come out. First we note that if we can work up the demand for coke to $7·50 per ton delivered, or a net price of $7 per ton in the yard, it will pay us better to use a cheaper grade of fuel under the retorts, and sell all the coke we make. We shall look upon the coke as a primary product to be sold at a profit, and not as a residual or bye-product. The tar will have a fuel value only; and the ammonia is to be sold at what we may happen to get for it. That we are steadily on a downward scale of prices for gas cannot be doubted. In the smallest cities the agitation is for "dollar" gas, while in the large ones the cry is for 75 c. or even 60 c. gas; and who can stop it? Do we gas men want to stop this lowering of prices, even if we could? On the contrary, we are desirous of helping the movement along, not recklessly or to the injury of the invested property interests entrusted to our care, but by striving in every direction towards economy in operation, and by building up the business in such a way as will make these demands of the public possible of fulfilment.

Mr. G. Williams (Madison) read the following paper on

PROMOTING NEW BUSINESS.

Under the conditions of the present average management, any gas company should increase their business and earnings from year to year without investment in a so-called "New Business Department" to some extent, owing to the constant discovery of new uses for gas—new buildings, natural increase in population on the lines of main, and the higher standard of modern methods of living. In other words, the gas company are to a certain degree forced to keep pace with the times. From a commercial standpoint, then, the company are on the same plane as the leading general store in the country village, sure of a certain volume of business, but too often contented with that certain patronage, and sometimes very independent in treatment of customers.

Assuming the position of a company who sincerely desire to make a marked financial success—with little or no increase of capacity to double their revenues within a period of two years—the following conditions would be almost essential: (1) Optimistic management; (2) harmonious conditions among the employees; (3) the goodwill of the public; (4) a uniform supply of good gas; and (5) direct and vigorous advertising, and sale and maintenance of gas lamps and appliances. These conditions are not impossible to attain; and they will be found to exist in the case of any gas company who have shown brilliant results. A company operating on methods common to any modern mercantile business must assume that they want all the possible business, and must reach out for it; and while it is impossible to get it all, enough will be secured for brilliant results. In these busy times, the company who are content will sooner or later become stagnated. The success will not come from accident or in six months; and the company have to be prepared to accept the success. Remarkably few companies get more than they reach for.

It is not unreasonable for a company to expect every family living on their mains to use gas exclusively for cooking purposes, and some for lighting and heating, and also to expect every business concern that could do so to advantage to use gas for industrial purposes; yet should only half of these possibilities be reached, it would in most companies produce net earnings several times greater than the present. Should a company instal every gas appliance within reason in every home, there would still be plenty of promotion work to be done in raising the standard of lighting, and educating the consumer to the further advantages of gas fuel.

Optimistic management demands the belief, anticipation, and enthusiasm in the possibilities and ultimate success of the desired achievements. Harmony between the management and the employees, between one department and another, and between every employee and the other, is necessary; and weekly meetings are possibly the quickest and surest methods of bringing all to the comprehension of what the company are trying to accomplish. Harmony will establish loyalty and higher efficiency.

The good will of the public is an easy condition to attain where a sufficient number of the representatives are employed to take care of the company's interests and their work, backed up by every employee's ambition to further the welfare of the concern. Courteous treatment over the telephone, in correspondence, and in every contact with the consumer, is possible and essential. Liberal daily newspaper advertising, and all progressive and modern methods in this department, tend to incline the public to a friendly attitude towards the company. It does not take long for the public to credit the company with good intentions, if these are sincere; and reaching out for more business is a very fair guarantee that the company are anxious to maintain their present business satisfactorily to the consumer. The public desire for municipally owned gas property sprung from the tendency of privately owned corporations to abuse their privileges. A properly organized promotion department will withstand any competition. If gas companies had existed in scriptural times, no doubt a text would have been found to say: "If gas companies would have friends, they must be friendly."

A uniform supply of good gas is absolutely necessary, as companies base many claims on the advantages of gaseous fuel for the production of even, steady heat. Besides this, a variation of supply, whether in pressure or in quality, creates a suspicion from the users that the company are either incapable of, or indifferent in, supplying them.

Vigorous lamp and appliance promotion requires modern commercial methods of publicity, exhibition, explanation, drawing of prospective customers, attention, and courtesy common to any line of retail business. This feature is too vital for a company to place outside the gas office. The sale of a stove signifies no profits unless followed by its use. Hence the desirability of placing large stoves that provide for the entire needs of a household, and supplying to the purchaser information as to their advantages. The sale of hot-plates and cheap ranges for kitchen use should never be tolerated; and this condition lies entirely within the control of the gas company. Care and maintenance, to give satisfactory service, call for that work being done by the gas company; and if promptly and honestly performed, it leads to increased sales.

"Hot-bed" methods to succeed demand expenditure; but the field is so great that almost any determined effort pays for itself. Many of my hearers will see the day when the merchant will cheerfully invest as much for illumination as for rent, the housewife will cook exclusively by gas, and every manufacturer who uses fire at all have a liberal daylight consumption. As long as new households are formed and new houses built, there will be a demand for more light and more fuel. Every reputable national magazine and newspaper will teach the benefits of gas as fuel, and show windows will be illuminated until midnight every night. The gas manager's life is too short, and his time too valuable, to trifle with half-hearted or obsolete methods. Enthusiasm and determination will mark the pace of the station meter and the price of the company's stock.

The Leeds Water-Works Engineership.—Of the four candidates for the appointment of Water Engineer to the Leeds Corporation which the Water Committee favourably considered out of the 57 who sent in applications, Mr. C. G. Henzell, M.Inst.C.E., has been selected for recommendation to the Council. Mr. Henzell, who is 42 years of age, is at present superintending, as Resident Engineer, the construction of the Catcleugh reservoir of the Newcastle and Gateshead Water Company.

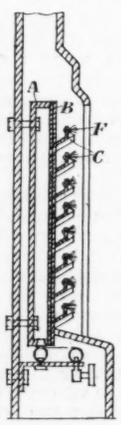
TARRING ROAD SURFACES IN PARIS.

The current issue of "Le Gaz" contains an article on the above subject which shows that the use of tar on road surfaces is becoming more general in the French capital. It may be remembered that at the last meeting of the Société Technique, MM. Mallet and Payet presented a paper in which numerous examples were given of trials made with tar for improving road surfaces, and the cost; and the conclusion was come to that, however the system might be extended, the gas-works would be equal to the supply of the necessary quantity of material. Towards the close of last year, the question was taken up by M. Forestier, the Keeper of the Bois de Boulogne, who presented a detailed report thereon to the French Society of Civil Engineers. He passed in review all the trials carried out from 1871 to the present time; and they were shown to have latterly assumed considerable proportions—the works executed last year for Paris alone covering about 24,000 square yards. He pointed out that when tarring road surfaces is carried out judiciously not only is dust suppressed, which is an enormous advantage as far as regards the public health, but the maintenance of roads is effected more economically. In fact, with an outlay of 1½d. to 2d. per square yard, and this incurred at intervals of two years only, the expense of keeping up the road is reduced 25 per cent. per annum, owing to the reduction in the wear of the materials constituting the surface. Our contemporary gives an illustration of a new tar-sprinkling cart designed by the Société Chappée et fils, of Mans.

The Paris Municipal Council are evidently impressed with the value of tar as a road preserver, for they have granted a sum of 5000 frs. for treating the roads in the Bois de Boulogne. This was done as the result of the presentation of M. Forestier's report, a few particulars from which may be of interest. In an experiment made on a surface of 16,770 square metres (about 20,000 square yards) in the Boulevard Maillot, 22·25 metric tons of tar were employed, or about 1·35 kilos. per square metre. The cost of labour was 374 frs.; and taking the tar at 80 frs. per 1000 kilos. (say, £3 5s. per metric ton), the outlay per square metre came to 12·8 c. It was found that, after treatment with tar, the road dried quickly after rain; and had it not been for the previous bad state of the soil, the surface would have had something of the appearance of asphalte pavement. During the heavy rains in the autumn, however, the road did not dry so rapidly. It remained black and damp, and wheels left marks upon it, although its cohesion was restored in dry weather. While the results of the trials in summer were satisfactory enough to justify the conclusion that the system is of incontestable utility, M. Forestier came to the conclusion that it could not be employed on promenades, as the appearance and odour of the tar, and the necessity for stopping traffic on hot days, were serious objections. He therefore recommended it for certain roads only. It appears that the road from Tourelle to St. Mandé looked quite new last July, though it had been tarred for a year.

REGISTER OF PATENTS.

Gas-Fires.—Jameson, J. (Executors of the late), of Newcastle-on-Tyne. No. 2878; Feb. 5, 1904.

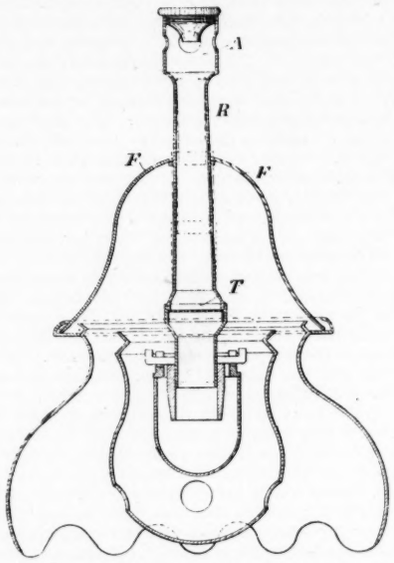


This invention has for its object to improve the effect produced by the process described in patent No. 26,839 of 1897. Instead of supplying a mixture of gas and air from a few orifices at the bottom of a plate holding tufts of material rendered incandescent by the burning gas, the plate is formed as the front plate of a vertical shallow gas-tight chamber into which the mixture of gas and air is led; and from the chamber the gas and air are caused to pass through a large number of small tubes fixed in the front plate "so as to distribute it in small jets with approximate uniformity over the whole surface of the front plate."

A is the chamber in which is contained mixed air and gas; and H is the mixing-tube communicating with it. B is the front plate of the chamber; and there is a thin sheet of asbestos or other non-conducting material which lies between it and a sheet of wire gauze. C are small tubes forming the orifices out of which issue the mixed air and gas for ignition at that point. Horizontal bars rest on top of the rows of tubes, and are perforated on the vertical plane by a number of small holes side by side, through which are threaded tufts of material F prepared so as to become incandescent when exposed to the flames issuing from the tubes.

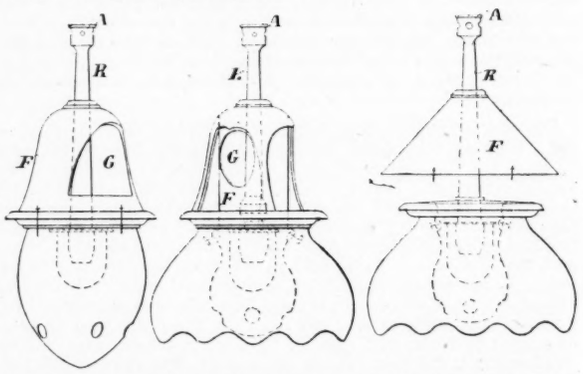
Incandescent Gas-Burners.—Lake, H. H.; a communication from the Deutsche Gasgluh-Licht-Aktiengesellschaft, of Berlin. No. 5086; March 1, 1904.

For a long time past, it is pointed out by the inventors, attempts have been made to improve the method of incandescent gas lighting in such a manner that the greater part of the light emitted may be downwardly directed (even without the employment of shades or reflectors) by the inversion of the burner and its mantle. But the products of combustion —which, of course, pass upwards—naturally heat the mixing-tube of the inverted burner highly, so that incomplete combustion and a sooty flame (which latter tends to light-back) are produced; and attempts have been made to obviate these defects by minimizing the heating of the bunsen burner by the use of insulating substances of various kinds.



The object of the present invention is different; the effect aimed at being only "to prevent the influence prejudicial to the efficiency of the burner, attendant upon the heating of the mixing-tube, while at the same time utilizing the heat of the waste gases for effecting a preliminary heating of the mixture of gas and air in the bunsen burner." It is perfectly clear that if the heat of the waste gases can be utilized, an increase of the illuminating power will necessarily result; and this end has been attained in accordance with the present invention by giving the mixing-tube a special form "based upon the physical reactions which take place in the tube."

The rules applicable to the dimensions (width and length) of the mixing-tube for upwardly directed bunsen burners may be taken as established; but almost all the burners for inverted lights present a form at variance with these rules. In many cases the mixing-tube is much wider than is required for an upright burner, and towards the outlet aperture they are mostly narrower or of the same internal diameter. They also vary greatly in length.



The applicants claim to have found that for inverted incandescent gas-burners, the following form of mixing-tube for upright burners obviates the prejudicial influences of the heat: The cross section of the mixing-tube must be normal at the suction-chamber end; but towards the outlet opening for the mixture of gas and air it should increase in accordance with the heating, and consequent increase of volume, resulting from the influence of the combustion gases. This increase of cross-section should be gradual; but, in order to facilitate the manufacture of the burner, it may take place in graduations without any appreciable detriment to the efficiency of the burner. As an example of the dimensions, assume an inverted incandescent burner in which the mixing-tube (the outlet opening of its nozzle being one square millimetre), beginning from the suction-chamber end, is 9·5 mm. in diameter and widens out to the outlet to 12 mm. A burner of this size shows 70-candle power constantly with a gas consumption of 90 to 95 litres of gas per hour; while another burner procured commercially, and not presenting the special form of mixing-tube characteristic of this invention, with the same mantle and under the same conditions, gave only 50-candle power at the best.

Experiments have shown that the efficiency of the burner is greater if care be taken that the heat generated by the flame is utilized as completely as possible for the heating of the mixing-tube. This increase of efficiency is particularly valuable on the one hand because the mixture of gas and air which passes out is more highly heated, and on the other hand because the widening of the mixing-tube—that is, the difference between the normal cross section at the admission place and its cross section at the discharge part—is greater, or because the tube for the mixture of gas and air may be made shorter. In attaining this object,

an important point is that there is arranged in the burner, around the mixing-tube, and with corresponding increase of cross section, a cap, casing, or the like which serves for storing up the hot gases rising from the flame in such a manner that the mixing-tube is surrounded and also is constantly enclosed by the highly-heated waste gases.

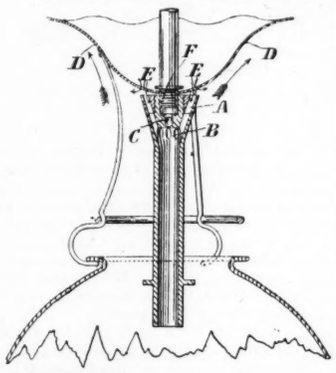
A vertical section is given through the burner, the mixing-tube, and the surrounding parts; also three examples of the cap for collecting and storing up the combustion gases.

The mixing-tube R, it will be seen, widens out towards the mouth, where is arranged the burner-head, of refractory material, which the incandescing body surrounds. There is fixed on the mixing-tube, below the air-suction aperture of the chamber A, a cap F, on which either the globe or a second (outer) lamp glass is supported. A portion of the waste gases is able to escape through one or more openings G, or at the lower edge of the cap; while the entire heat of the combustion gases is transmitted through the cap F to the mixing-tube. Above the burner-head the mixing-tube is provided with a widening T, in which gauze is placed, in order to prevent the flame from lighting-back into the mixing-tube. The arrangement is such that the cross section of the passage of the mixing-tube is not restricted by the gauze.

Inverted Incandescent Gas-Lamps.—Kay, M., of Clapton, N.E. No. 5841; March 10, 1904.

This invention comprises means whereby a current of comparatively cool, pure air is induced to pass over the air admission holes in the head or mixing-chamber of the burner.

The burner has air-admission holes A entering the head or mixing-chamber B in a concentric and parallel, or nearly parallel, path with the gas-nipple C; the burner-head being of the ordinary truncated conical type and extending downwards in the form of a tube, the lower end of which forms the point of the burner. Above the burner is a plate or cone D, of suitable material, having concentric perforations E about a central hole, which central hole passes over the nipple or screwed connection F of the gas supply—the burner engaging the nipple under the plate or cone and so securing the plate or cone firmly in position above the mixing-chamber.



The hot gases on leaving the mantle go up the sides of the burner, past the chamber B, and are deflected outwards by the plate or cone D, following the course shown by the arrow. The plate or cone is so shaped about the centre in the part directly above the air admission holes in the mixing-chamber that there is a free passage through the perforations of the plate or cone for the circulation of an air current from the upper side of the cone to the under side, while at the same time air also passes through the holes in the direction of the arrows into the mixing-chamber B. The current of fresh, cool air is set in circulation by the action of the deflected gases; and as the current of air is induced outwards on the under side of the cone over the air admission holes of the mixing-chamber, a quantity is also drawn into the burner; "thus securing the desired effect of supplying the burner with sufficient air for supporting combustion and ensuring the incandescence of the mantle."

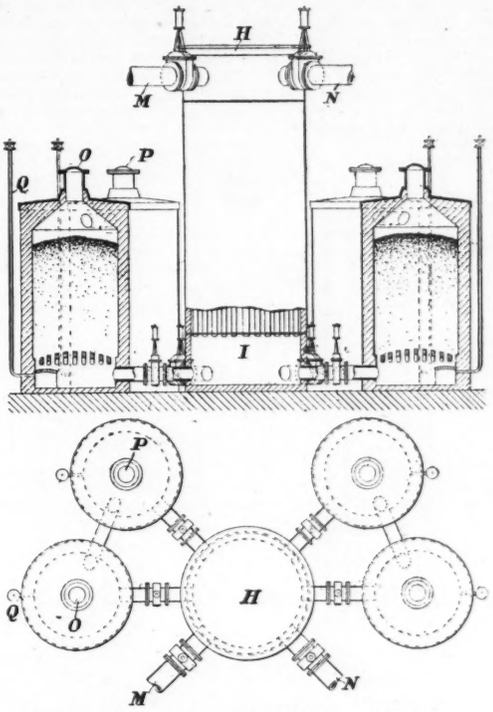
Railway Carriage (Incandescent) Gas-Lamps.—Delamarre, Comte H. M. H., of Paris. No. 12,251; May 30, 1904.

This invention has for its object to enable one and the same construction of incandescent gas-lamp to be used for all kinds of cars. The construction preferred is based on the employment of a single pattern of lamp—such as that described in patent No. 14,838 of 1903, which "includes all the devices necessary for effecting a good combustion of the gas and a satisfactory utilization of the light," and provided with a burner, either upward or downward directed, with a regulating needle device, as described in patent No. 6850 of 1904, wherein the central orifice of the bunsen injector is made with a larger diameter than would be required for the quantity of gas to be supplied, and has projecting into it a conical needle that can be adjusted so as to increase or decrease the annular space left between it and the sides of the orifice, and thereby regulate the gas supply to the exact amount required.

Making Water Gas.—Payens, L. A., of Nymegen, Holland. No. 21,317; Oct. 4, 1904. Date claimed under International Convention, Oct. 6, 1903.

In order to obtain uninterrupted working in the manufacture of water gas and producer gas, the patentee points out, it has been proposed in the German specification No. 148,753 to combine two generators with a steam-boiler of the tubular kind in such a manner that both at the period of air blast and of steam blast the gases may pass through the boiler and produce an uninterrupted supply of steam for the water gas. The present invention seeks to improve this method of working, by rendering it independent of the temporary stoppages of a generator which are necessary for clearing it of clinker or for repairs. A number of such pairs of generators as are described in the earlier patent, and again in this specification, are connected with a boiler common to them all. Thus, when it is necessary to stop working one or more of the pairs for the reasons stated, there are others which may continue at work so that the generation of steam is not stopped, and the generators which have for the time been out of operation may be started again at once.

As shown, two pairs of generators B C and B^1 C^1 are grouped around a tubular boiler H. The two generators of each pair are connected together at their upper and lower parts by pipes D C D^1 C^1, in which are valves. The lower pipes open into a chamber I at the bottom of the boiler; while from the top of the boiler, pipes M N, containing valves, lead each to a gasholder or to the exhauster which is in front of the holder. At the top of each generator is a charging opening. The pair of generators during the period of air blast are operated in parallel,



but in series during the period of steam blast; and in both cases the gases produced pass through the boiler, generating steam. Thus, taking the left-hand pair as an example, at the start the charging openings O P are open and the exhauster draws air down through both generators; the open valves, the fixing-chamber, and the boiler passing the producer gas formed into a holder connected with the pipe M. When the fuel in the generators is at a suitable temperature, the openings O and P are closed, and steam is admitted into (say) the lower of the pair of generators through the pipe Q. The steam passes up the incandescent fuel in this generator and down the incandescent fuel in the upper one. The lower valve being shut, and the upper one being open, the exhauster draws the water gas produced through the fixing-chamber I and boiler H, and passes it into a holder through the pipe N.

If now this pair of generators, for example, has to be stopped for any reason, the valves between them and the boiler are closed, while the right-hand pair of generators are continued in operation.

Producing Gas from Pulverizable Fuel.—Marconnet, G., of Paris. No. 25,404; Nov. 22, 1904. Date claimed under International Convention, Oct. 8, 1903.

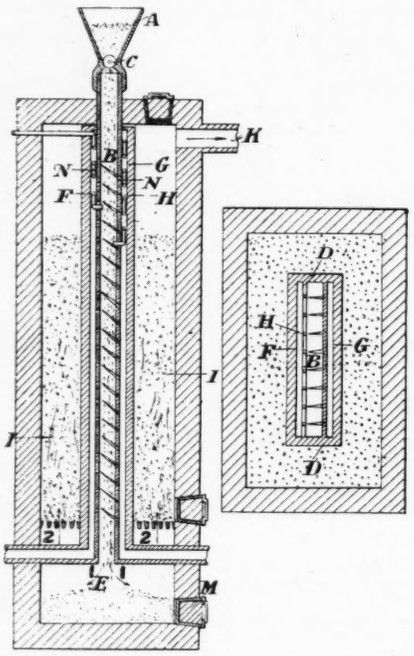
This invention relates to apparatus that admits of the complete combustion of a fuel whatever its percentage of cinders and volatile products; "the whole of its carbon being transformed into oxide of carbon." The process referred to admits of the complete combustion of fuel in the form of a white powder, while the cinders therefrom are deposited at a part where they will cause no inconvenience. Combustion is carried out to a certain extent atom by atom over a large combustion surface, and at a high temperature, in such a way that the combustion of the hydrocarbons may be complete, while, on the other hand, the "vitrifiable scoriae" cannot adhere together, except at a part of the apparatus from which they and also the cinders can be easily removed.

In principle, the process consists in allowing the pulverized fuel to fall, or be mechanically distributed, into the upper or inlet end of a shoot-shaped conduit the lower part or exit end of which opens into a cinder collector. The fine particles of fuel are consumed in their passage through the conduit by flames from a series of burners suitably arranged in stages on the main part of the shoot or tube and past which the particles of fuel travel.

In the construction of apparatus shown on p. 36 for applying this principle, the pulverized fuel is deposited, to the amount desired for a desired time, in a hopper A arranged at the upper end of a chamber or shoot B constructed of fire-clay. The bottom of the hopper is provided with a distributing device C that "causes the fuel to fall down like a shower of rain." The more rapidly the cone rotates, the greater will be the quantity of fuel that falls down in a predetermined period. The resistance offered by the air, into which this shower of fuel falls prior to its reaching the first burner H, divides it up still further, and changes it to a certain extent into a cloud, so to speak, composed of fine particles. The conduit B is a chamber of rectangular cross section the two side walls of which are separated by a few inches only and are much longer than the end walls D. The lower part of the conduit B

opens into a cinder collecting chamber E. The side walls form, in conjunction with the main side walls of the fire-clay shoot, conduits F G, respectively serving for the passage of air and for the passage of gas to burners H arranged in stages throughout the length of the conduit B. To form these burners, it suffices to pierce the walls with small holes H.

The conduit G is fed with poor or rich gas, and the conduit F with air. Both gas and air are subjected to slight pressure, so that they will pass out through the holes in the walls; and if one of the orifices be lighted, the whole group will catch alight. The conduit B thus forms a chimney in which opens a large number of small burners placed so that powdered fuel, falling in the form of a cloud, has to pass through a kind of gas gridiron of considerable height before it can reach the bottom of the conduit. The result is that, on reaching the bottom, each particle has been as far as possible completely consumed—that which remains in the solid state being nothing more than "unchangeable or dead matter."



As it is preferable that this combustion should be carried out at a high temperature, and that the air and gas reaching the conduits F and G should for this purpose be first heated, the whole of the three fire-clay conduits should be arranged in a second chamber I in which a coal or coke fire is kept burning—kept alight by the excess of air which may have traversed the conduit B without having been consumed, and which, in the example illustrated, will follow the direction of the arrows 1 and 2. The gas will pass to the upper end of the chamber I, leaving its dust in the chambers E and I, and will pass from the upper end of the chamber I, through the conduit K, to the purifying apparatus or washers, and to the gasholder and motor. A branch pipe connects to the conduit G so as to feed the burners H. The ash and cinders that collect in the chamber E may be removed by a door M.

In order to obtain gas richer in hydrogen, there may be arranged in the air and gas conduits F and G coils N receiving water under pressure, which, being converted into steam, passes through the conduit B with the fuel, and contributes, by its intermingling with the gas and air, to the production of perfect combustion.

Lighting and Extinguishing Gas-Lamps by Electricity.—Giorgi, G., of Florence, Italy. No. 27,297; Dec. 14, 1904.

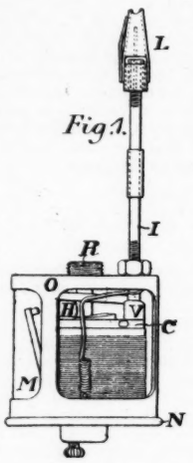
This invention has for its object the opening and closing of gas-taps and the lighting and extinguishing of the gas by an electric current. The appliance comprises an electro-magnetic gas-tap, an automatic electro-chemical lighter, and an arrangement of cut-out in the electric circuit.

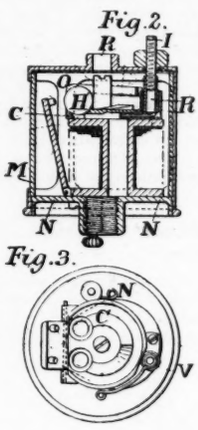
Fig. 1 is an elevation of the lighting and extinguishing apparatus. Fig. 2 is a vertical section of the lower part. Fig. 3 is a plan of fig. 2 with the cover removed. Fig. 4 represents a section and a plan of the lighter proper.

The inventor employs an electro-magnet having a central hole or passage in it, and provided with an armature on which are two striking pins. A platform C, of horse-shoe shape, is fixed firmly on the top polar surface of the electro-magnet with two holes passing through it to passages underneath; one of the holes communicating with the gas supply, and the other with a chamber V of an intermittent pilot-light tube I. The outside edge of the platform is provided with a guide-rail, and in the centre it has a hole through which passes a screw, between which and the guide-rail there is an annular space sufficient for a ball H to pass from one hole to the other. The floor of this annular space is not flat, but rises gradually from each hole to an apex at the point midway between them.

The automatic lighter L on top of the pilot-light tube is composed of two small concentric metal tubes, each of which has soldered to the top a metallic rheophore, connected together by a fine platinum wire protected by a metal hood with a small bent spring on one side. The ball H rests on one or the other of the holes in the platform, so as to close it hermetically.

The electro-magnet, the platform, and the ball are enclosed in a glass cylinder M, making a gas-tight joint with the base N and cover O. The cover is made in the form of a cage, and screws on to the base, which has a nipple to screw it on to the gas-fitting, and a terminal for a wire insulated from it and communicating with the wire of the magnet-coil. On the cover there is also a projecting screw R for the burner and a hole from which the pilot-light tube rises.





The operation is as follows: On closing the electric circuit by an ordinary push button or a switch, the armature is attracted by the electro-magnet, and the ball H (which is over the "tap closed" hole D) is knocked over to the other hole, and the gas then has free passage to the burner. While the current is passing, the armature remains attracted, and the ball cannot rest over the "tap open" hole to close it, as it is prevented from doing so by the striking pin on the armature O. Thus, as long as the electrical circuit is closed, the gas can pass through the chamber V, and the intermittent pilot-light tube I, and thus pass up to surround the platinum wire of the lighter.

The length and diameter of this wire are such as to cause a strong resistance to the electric current, and the passage of this current heats the wire to about 300° C. In this condition, the metallic platinum (or a metal of the platinum group) condenses the hydrogen of the gas and the oxygen of the air on its surface—the phenomenon of occlusion. The two gases, thus condensed, combine; and the temperature produced by the reaction is sufficient to make the wire white-hot, and thus ignite the gas issuing from the pilot-tube. This is said to take place so rapidly that, on closing the circuit, the lighting of the gas issuing from the burner "is ensured in a quarter to half a second of time."

When the current ceases, the armature returns by gravity to its position, and the ball rests completely over the "tap open" hole, immediately extinguishing the pilot-light, but the burner remains open. When the ball is over the last-named hole, a closing of the circuit will cause the armature to knock it round to the other hole, and immediately, on the cessation of the current, the ball will seat itself over the hole and thus cut off the gas from the burner. Thus, by closing a switch in an electrical circuit there is obtained "an almost instantaneous alternate opening of the tap and lighting of the burner, and a closing of the tap and extinguishing of the burner."

Torch for Ordinary and Incandescent Gas Lighting.—Tweedie, R. O., of Galashiels, N.B. No. 29,212; Dec. 31, 1904.

This invention relates to an acetylene torch, consisting of a wood pole, the lower end of which contains the acetylene generator and the upper end the torch. A pilot-light is kept at the upper end of the pole by means of a small pipe from the generator. Another small pipe is led from a small gas-bag attached to the side of the lower end of the pole, up to the upper end of the pole. The arrangement is such that, by passing the upper end of the pole through the hole in the lamp glass, slightly pulling down the gas-bag, and thus compressing same, a flash is projected across the top of the mantle, "whereby the mantle is readily lit, and without any danger of destroying the mantle."

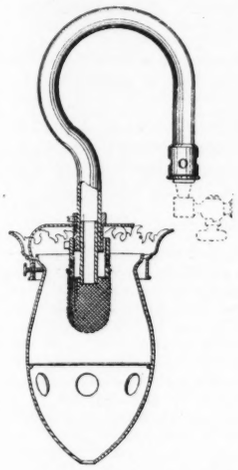
Mechanism for Lighting and Extinguishing Gas-Lights at Fixed Times.—Wildschiodtz, C. C., of Copenhagen. No. 29,415; Dec. 31, 1904.

This invention relates to improvements in the mechanism described in patent No. 25,293 of 1904—see "JOURNAL" for Jan. 31, p. 296; also March 7, p. 646.

The present invention aims especially at taxing the clockwork proper as little as possible whenever the releasing apparatus for the valve-actuating mechanism is to be brought into action; it being only required of the clockwork (which is always relatively weak) that it must be capable of raising a light lever-arm, while the more powerful releasing apparatus itself contributes to the release, and subsequently effects the operations necessary for actuating the stop-cocks. The invention presents, moreover, "the advantage that the clockwork may be adjusted so as to act with great punctuality, the releasing pins, which raise the lever-arm and cause it to drop down at the moment they pass a sharp edged tooth, moving on a circle with a relatively large radius."

Inverted Incandescent Gas-Burners.—Pledath, M., of Berlin. No. 28,359; Dec. 27, 1904.

This inventor proposes to make the mantle support of porcelain, magnesia, or the like—screwed on a socket similar to that of an electric incandescent lamp. The support is constructed as shown, so that it extends somewhat over the screw-threaded socket, and surrounds the burner or mixing-pipe, so that the air or the gases are enclosed in the mantle support. The mixing-pipe is thus at the same time protected from the outer air "so that the pipe does not waste away." Since it is necessary to maintain a slight draught within the mantle (otherwise too great a pressure would occur), it is advantageous to arrange flat surfaces around the circumference of the socket, so that a slight stream of gases may enter between the socket and the mantle support. The latter may also be perforated, so that the gas pressures may be equalized. When the draught apertures are used, there is no danger that the inner metal portions (such as the mixing-pipe or the socket) will be attacked, since only the products of combustion pass through them and the entry of fresh air is impossible. With a suitable distribution of these air-draught apertures, the gas burns steadily, without flickering; but a little flickering may ensue when the gas pressure is reduced. This fluctuation of the light is caused by the perforations in the lower part of the globe of the burner—absolutely necessary for the combustion process. Through these perforations a fluctuating draught goes on, which constantly alters the air pressures within the glass. To overcome this difficulty, the patentee places a perforated disc above the inlet apertures, so that air entering through the perforations of the shade will expand over the entire surface, and then rise without any fluctuation. An absolutely steady light is said to be obtained in this way, even with a strong draught or low gas pressure; and, in addition, the disc is found to give additional intensity to the illumination, when the gas pressure is low.

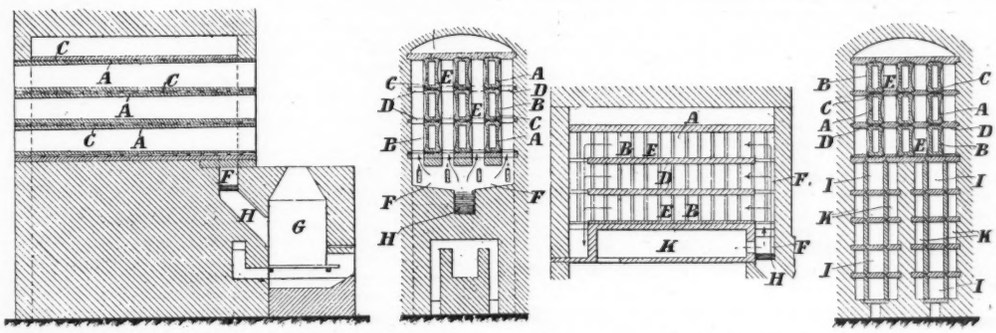


Furnaces for Horizontal Retorts.—Gielis, H., of Berlin. No. 92; Jan. 2, 1905.

This invention relates to a furnace for horizontal retorts, in which the combustion chamber for the gases escaping from the generator is not arranged in the longitudinal direction of the retorts, but transversely, and is in communication with channels lying in the longitudinal direction of the retorts and adapted to distribute the heating gases. The furnace is especially adapted for the construction described in patent No. 24,068 of 1903; and is designed to obtain a uniform distribution and guidance of the heating gases.

In the furnace illustrated, retorts A, of practically rectangular or square cross section, are used, provided with lateral stiffening ribs B, and above and below with other stiffening ribs C. The latter ribs, in conjunction with lateral abutments D, support the retorts at the sides; whereas the ribs B form vertical supporting pillars in the superposition of the retorts. The side-walls of adjacent retorts form horizontal longitudinal channels E serving for the distribution and guidance of the heating gases.

In the present furnace, the combustion chamber F for the gases produced in the generator G is located transversely of the retorts, and communicates at one end with the generator by means of the channel H and at the other end directly with the longitudinal channels E. The heating gases produced in the chamber F by the gases of combustion passing from the generator through the channel H therefore leave the chamber in a uniformly distributed manner, and enter the channels E; then pass along the sides of the retorts and impart their heat to their walls and to the charge of coal therein. At the rear, the longitudinal channels E terminate in a regenerator consisting as usual



of smoke-channels I and air-channels K, arranged side by side or one above the other.

The construction of the retort-furnace, it is claimed, is very much simplified by the arrangement of the combustion-chamber across the retorts, and communicating directly with the longitudinal channels between. Since with the arrangement of the combustion-chamber F as shown, the front ends of the retorts are obviously heated to a greater extent than the rear ends, the retorts are widened from the rear to the front, so that the charge of coal in the retorts becomes smaller in section according to the reduction of heat from the front to the rear.

APPLICATIONS FOR LETTERS PATENT.

5720.—Dempster and Sons, R., Ltd., and Radcliffe, J., "Purifiers." March 18.
5761.—Holmes, E. D., "Washing and scrubbing gases." March 18.
5773.—Ott, E., "Purifying gas." March 18.
5779.—Creed, F. G., "Gas-burners." March 18.
5786.—Jones, T. B., "Prevention of stopped ascension pipes." March 20.
5788.—Shapland, W., "Production of mechanical energy from gaseous products of combustion." March 20.
5810.—Blenheim, G., and Williams, E. S. V., "Production of gas." March 20.
5825.—Ellis, C., "Improvements in the art of making weak gas." March 20.
5830.—Kellermann, J., "Incandescent burners." March 20.
5849.—Constantini, E., "Gasifying apparatus." March 20.
5875.—Lezgus, L., "Water-meters." March 20.
5877.—Glover, R. T., "Gas-meters." March 20.
5881.—The National Gas-Engine Company, Ltd., and Robson, P. W., "Internal combustion engines." March 20.
5901.—Allman, W., "Inverted incandescent burners." March 21.
5945.—Bush, T., "Burner for Dowson gas." March 21.
5959.—Kelly, T. D., and Billington, W. J., "Burners." March 21.
6025.—Anderson, W., "Inverted burners." March 22.
6031.—Wachter, E., "Acetylene lamps." March 22.
6048.—Bargamin, C., "Gas-stoves." March 22.
6074.—Mannesmann, O., "Gas-burner." March 22.
6080.—The British Thomson-Houston Company, Ltd., and Ahlquist, K., "Rendering available the energy of gases." March 22.
6119.—Rowbotham, T., Booth, S., and Osborn, H. J., "Gas-producers." March 23.
6127.—Appleton, D., "Gas-kettles." March 23.
6133.—The New Inverted Incandescent Gas-Lamp Company, Ltd., and Bridger, J., "Inverted burners." March 23.
6134.—Blake, E. W., "Gas-lighters." March 23.
6179.—Still, W. M., and Adamson, A. G., "Incandescent lamps." March 23.
6206.—Morris, J. M'V., "Acetylene generators." March 24.
6231.—Macaulay, D., "Carburettors for internal combustion engines." March 24.
6236.—Riotte, C. C., "Multiple-cylinder gas-engines." March 24.
6285.—Spreadbury, R. J., "Incandescent lamps." March 24.
6297.—Cutler, S., "Purifiers." March 24.
6314.—Rowbotham, W., and Havilland, I. M. C. J. de, "Generating power." March 25.

Progress of the Prepayment Business at Dartmouth.—The report presented at the annual meeting of the Dartmouth Gas Company last Tuesday showed that the profit on the year's working amounted to £563, out of which the Directors recommended payment of a dividend of 9s. per share. Mr. R. W. Prideaux, the Chairman, said that the receipts from private lighting were £2147, and they had also received £921 from prepayment meters. The latter amount really represented only eight months' working. During the year 224 prepayment meters and stoves had been fixed, and the total number at the end of 1904 was 431. To have developed the business to this extent in two years was very creditable to the Company. Mr. J. Bartlett said the revenue from prepayment meters would this year reach £1300. The Manager (Mr. W. Tall) and the staff were thanked for their services, and an increase in the salary of the former was approved.

Reduction in Price at Exmouth.—It was reported at the annual meeting of the Exmouth Gas Company last Tuesday that the result of the past year's working had been very satisfactory, and that after carrying £1000 to the reserve fund there was an available balance of £3698. It was decided to pay the maximum dividends, and to reduce the price of gas, as from the 25th ult., by 2d. per 1000 cubic feet, making the price 3s. 6d., or with the rebate of 5 per cent. for prompt payment 3s. 4d. net. Mr. J. Palmer, the Chairman of the Company, congratulated the shareholders on the satisfactory position of the undertaking. Reference was made by one of the shareholders to the introduction of the electric light. The Secretary (Mr. J. T. Foster) said he did not think it would affect the Company much. There was plenty of room for both gas and electricity; and with the advantage which the Company offered to their customers they need not fear competition.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

The following further progress has been made with Bills:—

Bills brought from the Commons, read the first time, and referred to the Examiners: South Metropolitan Gas Bill and Walker and Wallsend Union Gas Bill.

Bill reported, with amendments: Hessle Gas Bill.

Bill read the third time and passed: Tralee Urban District Council Bill.

The Abertillery Urban District Water Bill, Bangor (County Down) Water and Improvement Bill, Matlock Bath Improvement Bill, and Southport, Birkdale, and West Lancashire Water Board Bill have been referred to a Select Committee, consisting of Lord Barnard (Chairman), the Earl of Westmeath, the Earl of Leitrim, Lord Castlemaine, and Lord Lyveden; to meet on Thursday, May 11.

The Blackpool Improvement Bill, Hythe Corporation Bill, Mansfield Corporation Bill, Nottingham Corporation Bill, and the Whitby Urban District Council Bill have been referred to a Select Committee, consisting of the Earl of Dartrey (Chairman), the Earl of Verulam, Lord Oranmore and Browne, Lord Shute, and Lord Estcourt; to meet on Thursday, May 11.

HOUSE OF COMMONS.

Friday, March 31.

VENTILATION OF TELEPHONE INSPECTION CHAMBERS.

Sir THOMAS DEWAR asked the Postmaster-General whether his attention had been called to a recent action to recover damages for personal injuries sustained through the explosion of gas in a telephone inspection chamber fixed in the footway in Regent Street; and whether, seeing that both Judge and Jury expressed the opinion that, in the interests of public safety, the accumulation of gas in these chambers should be prevented by a system of ventilation, he would say if he proposed to adopt the suggestion.

Lord STANLEY said his attention had been called to the case, and it had been carefully considered. He feared that ventilation of the inspection chambers was not practicable, as he did not think the Local Authorities would consent to his fixing ventilating pillars in the footways, and the owners of private houses would not allow him to carry pipes up the walls. Ventilating covers could not be adopted, because they would not keep the cables free from mud and water. He was proposing to lay down certain precautions to be taken by his staff when opening manholes in which the presence of gas was suspected; but it was right to say that, so far as the facts were known to him, no precautions taken by his employees would have prevented the recent explosions in Regent Street.

The following further progress has been made with Bills:—

Bill brought from the Lords, read the first time, and referred to the Examiners: Tralee Urban District Council Bill.

Bill presented and read the first time: Malvern Water Bill.

Bills reported, with amendments: Birmingham Corporation Bill, Brentwood Gas Bill, Croydon Gas Bill, Great Berkhampstead Gas Bill, North Sussex Gas Bill, and Otley Gas and Improvement Bill.

Bills read the third time and passed: Brompton, Chatham, Gillingham, and Rochester Water Bill, Morley Corporation Bill, South Metropolitan Gas Bill, and Walker and Wallsend Union Gas Bill.

UNOPPOSED BILLS.

Several unopposed Bills came before a Committee of the House of Commons on Thursday—Mr. LOWTHER presiding.

Brentwood Gas.

This Bill provides for the incorporation of the Brentwood Gas Company—a limited Company—and confers powers upon them for the supply of gas. Formal evidence having been given, the Bill was ordered to be reported.

Croydon Gas.

By this Bill, it is proposed to transfer to the Croydon Gas Company the undertaking of the Caterham and District Gas Company, to extend the limits of supply of the Croydon Gas Company, and to authorize the Company to raise additional capital. Sir Chandos Leigh inquired as to the standard of 14-candle power. Mr. Corbet Woodall said it was a very useful standard for incandescent burners. He referred to a case where a very high power—20 candles—was tried, and said that in that instance the mantle was blackened. Formal evidence was given, and the Bill was ordered to be reported.

Great Berkhampstead Gas.

This Bill provides for incorporating and conferring powers upon the Great Berkhampstead Gas Company. After formal evidence, the Bill was ordered to be reported.

North Sussex Gas.

This Bill seeks to incorporate the North Sussex Gas Company, and to enable them to supply gas to certain parishes in the vicinity of Horsham. After formal evidence, the Bill was ordered to be reported.

HITCHIN AND DISTRICT GAS BILL.

A PURCHASE CLAUSE REFUSED.

House of Commons Committee.—Tuesday, March 28.

(*Before Mr.* AGG-GARDNER, *Chairman, Mr.* BRIGG, *Mr.* BATHURST, *and Mr.* WALDRON.)

This is a Bill to confer upon the Company (a non-statutory one) the ordinary statutory powers, to authorize an increase of capital, and for other purposes.

Mr. BALFOUR BROWNE, K.C., Mr. CLAUDE BAGGALLAY, K.C., and Mr. PADDON appeared for the promoters; Lord ROBERT CECIL, K.C., and Mr. HUTCHINSON represented the petitioners—the Hitchin Urban District Council, who asked for the insertion of a purchase clause.

THE CASE FOR THE PROMOTERS.

Mr. PADDON said that the Bill was intended to give the Company statutory powers, to enable them to raise additional capital, to define the limits of supply, to consolidate existing capital, to extend their borrowing powers, and to adopt the sliding-scale. The Urban Council, who were the only petitioners against the Bill, had an Electric Lighting Provisional Order which they could exercise at any time; and this disposed of any question of the Company having a monopoly. The Company had carried on their business for many years, and there had never been any complaint as to the quality of the gas supplied. The district was a purely rural one. The Company's present capital consisted of £7000 share capital; and they had in addition £14,000 in the form of loans from the bank on mortgages. At present they were paying 10 per cent. on their share capital, and now proposed to convert this into £14,000 bearing a standard dividend of 5 per cent., which was a very usual thing to do. They also sought power to raise an additional £36,000 of 5 per cent. capital, and asked for the usual borrowing powers of one-third. The present price for gas to the ordinary consumer was 3s. per 1000 cubic feet, which was exceptionally low considering the conditions. The charge to the Local Authority was 2s. 5d., which was an absolute record for gas of this quality. In addition to this, the Company had put up the lamp-standards free of charge. The capital of £21,000 worked out at £420 per million cubic feet of gas sold per annum; whereas the average of companies of similar size and situation was nearly £900. The explanation of this was that the Company employed for capital purposes money they had saved from their profits. He denied altogether that exceptional profits had been divided. The Company strenuously objected to being purchased. He knew there was an initial difficulty in front of him there, because it had been the practice to give such powers as were sought by the petitioners in respect to non-statutory companies coming to Parliament. He was going to ask Parliament not to give the Local Authority power to purchase; and the reasons were the exceptional character of the Company, the exceptional way in which they had discharged their duties to the public, and the fact that it could not be hoped for that any better administration would succeed the present one—in a word, it was not to the public interest that the undertaking should be otherwise administered. They had been very liberal in their interpretation of their duties, and had divided much less profits than they could have done. He thought the whole atmosphere had largely changed in late years, and there was not the overwhelming demand for municipal enterprise that there was some time ago. The only thing which underlay the application for purchase was cupidity. The present qualification of Directors was £200, and there were nine. The number by the Bill was reduced to five, as soon as the existing ones dropped out of office.

EVIDENCE IN SUPPORT OF THE BILL.

Mr. *William Hill*, the Chairman of the Company, in answer to Mr. PADDON, said the Company was formed in 1834. For about thirty years they had paid a dividend of 10 per cent. No company in Hertfordshire, under similar conditions, supplied gas at so low a rate. The Council made an offer of £33,250, which, after deducting debentures, left the shareholders £19,250.

In cross-examination by Mr. HUTCHINSON, witness said he rejected the offer as being insufficient.

Mr. HUTCHINSON: Suppose you were to receive a purchase price which would give every one of your existing shareholders precisely the same income on his capital that he has enjoyed for the last 25 years, how would he be hurt?

Witness: I should say that it would not be enough.

Have not the consumers found the whole of the capital which has enabled you to quadruple your output from 1866 up to the present time?—Yes; but we can sell the gas cheaper.

In 1900, your price was 3s. 6d. per 1000 cubic feet; in 1901, 4s.; in 1902, 3s. 9d.; in 1903, 3s. 9d.; and in 1904, 3s. 6d?—Yes.

You have been dividing more than 10 per cent.; you have paid income-tax upon the dividend, which makes 10½ per cent. Now, if you were a statutory company, you could not have charged the unfortunate consumer a bigger price than would give you 10 per cent. If you were a statutory company, the maximum which Parliament would have allowed you would be £700; whereas in the balance-sheet you have £3500—five times as much?—There is no such thing as a reserve fund. It is all in the works.

In addition to the 10½ per cent. for 25 years, the unfortunate consumer has got no reduction in price; and you have up to 1899 accumulated £6700, all out of his pocket. Do you know that this £3500 remained intact, and that the floating cash balance to the credit of profit and loss increased from £3250 to £6105?—Yes. It was all spent.

In 1900, which I am dealing with, you had £2600 cash at the bank. That makes £9600; and Parliament would have said: "You shall not have more than £700." From 1900 to 1904, you have added to the profits by £2158?—If we had not done this, we should have had to raise fresh capital.

You let the consumer raise it?—Yes; and he benefits by it.

Do you know, if you had not done this, you could have supplied gas at something like 2s. 8d. per 1000 cubic feet? What is the initial price you are asking in your Bill?—3s. 9d. per 1000 cubic feet.

At Watford they supply at 2s. 9d.?—That is not on the same line of railway.

Luton is 2s. 4d.?—Both Watford and Luton are much larger Companies.

If you had not used these profits as capital, you could have done the same. Just listen to this quotation from Michael and Will's book on "The Law Relating to Gas and Water": "When a non-statutory company come to Parliament seeking re-incorporation and statutory powers, and the local authority oppose and seek powers to purchase the undertaking, and give a pledge to come to Parliament with a Bill for this purpose in the next session of Parliament"—and I now give this pledge, so that we are on all-fours—"it is the general practice of Committees, if they pass the company's Bill, to impose the condition of a purchase clause to the effect that if the local authority should promote a Purchase Bill in the next session of Parliament, the company should not oppose it." You would not say Parliament is unfair?—No; of course not.

Re-examined by Mr. PADDON: The consumer had the use of the money after he had parted with it. No capital had been raised since 1870. capital had been raised, the consumer would have had to pay interest on it in the price of gas.

Mr. *W. R. Phillips*, examined by Mr. PADDON, said he had had over forty years' experience in the construction and management of gas-works, and was Engineer and Secretary of the Luton and Hitchin Gas Companies. About £13,788 had been expended on works out of profits which had not been distributed in dividend; and on this money no interest was returnable. He put the structural value of the works to-day at £31,780, and £7000 or £8000 in addition for stock, tools, and working capital. In 1900, the sale of gas was 34,276,000 cubic feet; in 1901, 35,492,000 feet; in 1902, 38,215,000 feet; in 1903, 38,931,000 feet; in 1904, 42,703,000 feet; in 1905, 2,500,000 more than in 1904. The works would do 35 per cent. more than was now required.

In cross-examination by Lord ROBERT CECIL, witness said that the offer of the Council had been £55 for a £20 share; the market price being £45. The Council had also been willing to let the Company have their cash balances.

Mr. *Arthur F. Phillips*, in reply to Mr. BAGGALLAY, said the proposals in the Bill were necessary for the proper carrying on of the undertaking. The works were quite modern, and exceedingly satisfactory. They were economical in production, and situated on a most convenient site, and had been well managed and maintained. Assuming there would be an increased consumption of 45 million cubic feet the next ten years, £800 per million would be a fair figure having regard to the size of the works; and this made the £36,000. The actual present capital worked out to between £400 and £450 per million feet. This was because a considerable amount of the capital did not appear in the accounts, as it had been provided out of divisible profits. The Company had never divided more than 10 per cent.

Lord ROBERT CECIL (in cross-examination): Do you defend the standard price of 3s. 9d., for which the Bill asks?

Witness: I defend most strongly a standard price of 3s. 6d., which is a very fair one.

The CHAIRMAN: How will the standard price affect your dividends?

Witness: If the standard price was fixed at 3s. 6d., and the Company maintained the present price of gas, it would enable them to pay a dividend of 10½ per cent. on their share capital. I say they are entitled to 10½ per cent. because they have had their dividend free of income-tax.

The CHAIRMAN asked how many more witnesses the Company had to call.

Mr. PADDON said that Mr. Corbet Woodall would be the last important witness; but there were some local witnesses as to the quality of the gas supply.

Mr. HUTCHINSON said all he wanted was a proper price for gas, and power to purchase the undertaking. He had nothing to say against the quality of the gas supply.

Mr. *Corbet Woodall*, in answer to Mr. PADDON, said gas companies should be encouraged to come to Parliament, to be brought under obligations; but if it was to be the rule that when they did come they would be compelled to sell their undertakings, then they would be discouraged from coming. He agreed with the last witness that the sales would double in ten years; and in that case the whole of the capital asked for would be required in the ten years. It was ungenerous to advance the argument against the Company that they had employed profits to build up their undertaking instead of dividing them among the shareholders, as they were perfectly entitled to do. Everybody connected with the Company had abundant reason to be proud of it. Instead of raising share capital, upon which they could have paid 10 per cent. or even more, the Directors had lent money to the Company at 3½ per cent.

In cross-examination by Mr. HUTCHINSON, witness admitted that in recent years it had been the practice of Parliament to insert a purchase clause in favour of the local authority in Bills of this kind. He was strongly of opinion that gas companies ought to come to Parliament to be put under regulations which Parliament had deemed proper for them.

Mr. HUTCHINSON: If this were a statutory company, you would not say that it was a fair thing to use the consumers' money to inflate the capital.

Witness: I repudiate the suggestion contained in your observation. The Company have not taken one farthing of the consumers' money in any improper or blameable way. They have taken very reasonable profits; and the rest of the money they have put into the undertaking. It has all been used for the advantage of the consumer, without costing him a halfpenny. When the Bill is passed, the Company will not be able to do as they have done in the past; but I say emphatically that what they have done has really inured to the advantage of the consumers.

I think you told the Committee, in order to justify what we regard as the extravagant capital powers asked for by the Company, that no less a sum than £800 per million feet of gas will be required?—Yes, in future, having regard to the fact that the business to be obtained by gas companies is that of small consumers, who are very costly.

I have two pockets, a capital pocket and a revenue pocket. Does it matter which I put my money into?—It matters whether you will get any return upon it or not.

Do you not see you get it back, because, instead of being a burden to the undertaking to the extent of £800 per million feet, you have only to burden it to the extent of £420?—If I am able to earn more than 10 per cent., what a fool I am not to do so, according to your point of view!

To take the thing upon broad lines, the difference between the capital expenditure of £800 per million and £420 per million represents the capital which, as we say, has been taken from the consumers?—And, as we say, has been contributed by the shareholders.

You told the Committee that, in the case of purchase by a local authority, there is no advantage to the public?—I believe in this case there would be no advantage whatever to the public, but from every point of view the reverse.

Upon an equitable basis, upon the usual form that Parliament has invariably given in cases of this kind, is there any disadvantage to an individual shareholder?—If I were a shareholder in the Company, I should object to being dispossessed of property which I valued, and in which I saw potentialities of further advantage.

Can you mention one single parallel case to this Company in the whole range of your experience?—I cannot mention a single company of the same size standing on such good ground as this one does.

Have you formed any idea of the structural value?—Yes. I think the figure of £32,000 given by a former witness is low

In re-examination by Mr. PADDON, witness said that in many cases local authorities had been induced to purchase by a totally inadequate idea of the true value; and when it was shown in the arbitration proceedings what the true value was, they had deeply regretted having entered upon the transaction.

Two witnesses were then called to prove that resolutions had been passed in neighbouring Parish Councils approving the Bill.

Mr. BALFOUR BROWNE said this was the case for the promoters.

THE QUESTION OF THE PURCHASE CLAUSE.

Lord ROBERT CECIL said the question he proposed to address himself to was that of purchase—whether there was any reason why the rule which had been acted upon, at any rate for the last 25 years, should not be applied in the present instance. The case for purchase by a local authority depended primarily upon the duty which was thrown upon them of lighting their district; and, generally speaking, lighting was so clearly connected with sanitation and the keeping of public order, that it was advantageous that it should be in the hands of the local authority. The necessity of breaking up streets was an additional reason. The first question in this case was: Was there anything which put the Company outside ordinary companies to such an extent that the rule should not apply? They had paid a very considerable dividend for thirty or forty years, and had kept the price of gas higher than they need have done in order to keep up the dividend and maintain the works. In a sense, it was true that the necessity of raising capital was prevented by the course which the Company had adopted; but the advantage of this to the consumers was less than if they had applied the money to a reduction in the price of gas. If they had been so extravagant as to pay more than 10 per cent. dividend, as had been suggested, they would not have been allowed to remain in Hitchin; they could have been bought up years ago. A purchase clause was no hardship on the Company. The 125 shareholders who shared £700 per annum would be given enough to buy very nearly gilt-edged securities to continue them their income; and beyond this they were not entitled to anything. There were cases where it was a hardship—where, just as the company were beginning to be successful, they were bought up; but this was not so in the present instance. Now was the time for the Local Authority, in the public interest, to buy the undertaking. If they did not, the Company would become a statutory concern, and the Authority in the future might have to pay much more for the undertaking; and they would not have the right to purchase, as he submitted, under the practice of Parliament, they had now. He asked that there should be an open arbitration purchase clause in the ordinary way, binding the Authority to come with a Bill next session, or, in view of a possible dissolution, the session after. He did not propose to submit evidence on the point, though it was ready.

Mr. BALFOUR BROWNE said his learned friend was not opposing the preamble; and therefore he was entitled to reply on the proposed clause.

Lord ROBERT CECIL denied that he was not opposing the preamble; he opposed it conditionally. This was a course frequently taken before Committees; and his learned friend had no right to reply.

The CHAIRMAN said Lord Robert might be right as a matter of procedure; but the case was an exceptional one, and the Committee would like to hear Mr. Balfour Browne in reply.

ARGUMENTS AGAINST THE PROPOSED TRANSFER.

Mr. BALFOUR BROWNE said Lord Robert Cecil had stated there was a rule that, when a non-statutory company came to Parliament and asked to become a statutory company, the local authority intervening were entitled to a purchase clause. He knew of no such rule. It had been done in several instances; but he ventured to say that the whole idea of Private Bill Legislation was that each case had to be heard on its merits. If a company had failed to do their duty, for example, he could quite understand the local authority saying: "Do not give them statutory powers at all, or, if you do, put in a purchase clause." If there were any general rule, it would be a Standing Order of the House. But there was not; and the Committee had to decide on the merits, which were all in favour of the Company. Lord Robert Cecil had pointed out that the Company had spent a large sum out of revenue

upon capital; but he had failed to understand that this had been to the consumers' benefit. Lord Robert seemed to assume that the Company were limited to a 10 per cent. dividend. Nothing of the sort. If they had earned it, they might have divided 20 per cent. It was said it would have been monstrous to divide more than 10 per cent. The large London Companies were dividing, on their sliding-scale, 11 and 12 per cent. to-day. Why did the Company not divide more? Merely because they knew that they were carrying out a public work in the interests of the consumers; and they limited themselves to 10 per cent., with the result that large sums had been spent upon the works which the proprietors might have put into their own pockets. These works were much more valuable than the mere income represented; and the consumers were having the benefit, because no dividend was paid upon this extra value. His friend's case was that there would be no hardship in the Company being compelled to sell. He ventured to assert that there would be gross hardship. What did Lord Robert say was to be bought? The £700 a year. That was, he would multiply this by 28½, or possibly only by 25, which would bring it to £17,500, though the works were worth £32,000. This had been proved; and no evidence had been called on the other side to show it was not true. This was a disgraceful hardship. As a fact, the Council had offered £33,000, and now wanted the concern for £17.500. Again, if the Committee inserted a purchase clause in the Bill they would be doing something which they had not been asked to do by the ratepayers of Hitchin at all. It was only the Local Authority who desired it; and they had no mandate. They had never had a public meeting. He held in his hand a list of dozens of cases where a purchase clause had been introduced, and nothing had been done upon it.

THE EXAMPLE OF REDHILL.

In the case of the Redhill and Reigate Bill, the House of Lords Committee presided over by Lord Lauderdale said they thought a purchase clause should be introduced. This was the only case where a statutory company was ever made to sell by compulsion; and the result was the Redhill and Reigate people withdrew their Bill. The next session a ratepayers' meeting was called, and the Local Authority promoted a Bill to purchase the Redhill and Reigate Gas Companies; and what did the ratepayers do? They rejected it, and said they would not promote the Bill. If this clause had been introduced into the Company's Bill, the Local Authority, contrary to the wish of the ratepayers, would have purchased. The Hitchin Company had admittedly done well by the public; and he asked the Committee not to give the clause. Lord Robert Cecil had said there was an idea that local authorities should light their own streets. This was true; but it was quite a different thing, when a local authority had power to light their streets by electricity, to give them also the power to control the gas. As they had one means of illumination, it seemed prudent that the other should be in different hands, so that there might be competition in the interests of the public.

A PURCHASE CLAUSE REFUSED AT BOGNOR.

He was asked if he could give an instance where the clause had been refused. It had been refused in the Bognor Gas Bill of last session—a Bill confirming a Provisional Order empowering the Bognor Gas Company to construct further works and raise additional capital.

Mr. HUTCHINSON: That was a statutory Company.

Mr. BALFOUR BROWNE said the assertion there made was that the Company was non-statutory.

Mr. HUTCHINSON: That contention failed.

The Committee-room was then cleared; and after the Committee had sat *in camera* for half-an-hour, Counsel were sent for privately, and informed that evidence as to the capacity of Hitchin to purchase was desired.

Wednesday, March 29.

THE FINANCIAL POSITION OF HITCHIN.

Mr. HUTCHINSON said he proposed to call evidence showing the exact financial position of the Hitchin Urban District Council in relation to their ability to purchase the works, and also to show how their electric undertaking was being conducted.

Mr. *W. Times*, the Clerk to the Urban District Council, was called, and in reply to Mr. HUTCHINSON said the rateable value of the urban district at the present time was £51,700. Under the Public Health Act, their borrowing powers were £103,400. The total indebtedness was £19,394. The rates were at present 3s. in the pound, and there was no probability of them increasing. The three concerns under the Council were the market tolls, water-works, and electric light. The market tolls were purchased from the Crown in 1883 for £4000. The receipts at present just about met the repayment of principal and interest. When they were constituted an authority in 1873, the Council automatically took over the water supply. In 1902, there was a loss of £41, after paying principal and interest; in 1903 a profit of £153; and in 1904 a profit of £41. The water undertaking was in an efficient condition; and the rates were moderate. With regard to the electric lighting powers, the Council took their Provisional Order in 1902, so as to protect the district against the encroachments of what they conceived to be a hostile Company—the North Metropolitan Supply Company. Under section 11 of the Electric Lighting Act, the Council were advised their best course was to enter into a contract with responsible persons for the supply of electrical energy, which was done with Messrs. Crompton and Co. The Council had the right, at the end of fourteen years, to purchase by arbitration as between willing seller and purchaser; and there was also a clause by which the Council could at any moment take over the whole works by paying 15 per cent. on the investment. When the gas undertaking passed into the Council's hands, there was no power to enable them to contract for the management of it. But even if there were the power, it was the intention of the Council to work it themselves.

In cross-examination by Mr. PADDON, witness said he was also a Director of the Gas Company. He admitted that the purchase of the Rickmansworth Gas Company, whose output was 18 million cubic feet, cost the ratepayers nearly £40,000, though the Hitchin Council had only offered £33,000 for their Company, with an output of 50 millions. The re-investment of the Rickmansworth shareholders' money would bring them the same income as that which the Council had offered the shareholders of the Hitchin Gas Company. It was quite possible they might have to incur expenditure on the water-works.

Mr. PADDON: If you are content that the electric supply should be carried on by a private undertaking, why should you wish to have the Gas Company under your own municipal direction?

Witness: The electric supply is an experimental thing. The gas supply is sure.

THE WISHES OF THE RATEPAYERS.

The CHAIRMAN: Has any attempt been made to ascertain the feeling of the ratepayers? Has any desire been expressed on the part of the ratepayers to purchase?

Witness: A Bill cannot be promoted in Parliament without their assent.

Has it been a public question?—There has been an election of councillors; and it has been suggested that, as they were elected without opposition, they agree with the policy of the Council. Columns have been written about it in the local newspapers.

Has there been no petition?—No.

Do you think the Council will improve matters if they take over the gas undertaking?—No, they do not think that; but they believe the works should be in their hands.

Do you expect an increase of rates in connection with the water supply?—Oh, no. We have plenty of water; but we shall want more storage.

Mr. PADDON: Mr. Balfour Browne said yesterday that we had a large mass of evidence showing that the ratepayers do not want the gas undertaking purchased. He said he would not call it, but only mention it. I wish to point out that my learned leader offered the evidence.

Lord ROBERT CECIL said this was most irregular. If called, the witnesses would have been subject to cross-examination.

Mr. BATHURST: What advantage will the consumers get from you acquiring the gas-works?

Witness: As consumers, they would not be materially benefited. They would not be injured; but I do not think they would be benefited. But as ratepayers they would get the whole benefit of the surplus revenue to the credit of the rates, and therefore would have less to pay.

Lord ROBERT CECIL said that, of course, the purchase would be by arbitration; and he did not wish their position to be prejudiced in any way before the Arbitrator by what took place before the Committee. At the same time, he was so anxious nothing should be kept back from the Committee, that he was quite prepared to call their expert, who would deal with the question much more fully, if the Committee desired any information as to the business aspect.

The CHAIRMAN: I do not think we want any further evidence on that.

THE PURCHASE CLAUSE REFUSED.

The Committee-room was cleared. After about ten minutes, the parties were re-admitted, and

The CHAIRMAN said the Committee found the preamble proved.

Mr. PADDON: And no purchase clause?

The CHAIRMAN: And no purchase clause.

The clauses were then adjusted, and the Chairman was ordered to report the Bill to the House.

HESSLE GAS BILL.

This Bill last Tuesday came before Lord ONSLOW, the Chairman of Committees, in the House of Lords, as an unopposed measure.

The Bill contains proposals for incorporating and conferring powers upon the Hessle Gaslight and Coke Company. The Company was formed in 1861 to supply gas to the town and neighbourhood of Hessle; and in 1904 they added to their objects other matters connected with the business usually carried on by gas companies, and also the supply of electricity. The preamble further states that the demand for gas is increasing in the existing area; that there is also a demand in the parishes of Willerby and Kirk Ella; and that therefore it is expedient that the existing Company should be dissolved and reincorporated, and authorized to extend and improve the gas-works, and that additional capital should be provided. The present capital of the Company is £21,000; and it is proposed by the Bill to increase it to £30,000.

Formal evidence was given, and the Bill was ordered to be reported.

West Gloucester Water Company.—At the recent half-yearly meeting of this Company, the Directors reported that 213 additional services had been laid on, making the number of houses and other properties supplied 9153. These and some meter supplies were estimated to produce an annual water rental of £9003 per annum. The net profit for the half year amounted to £2752; and dividends were declared at the rate of 4 per cent. per annum on the 10 per cent. shares, and of £2 16s. per cent. per annum on the 7 per cent. shares.

A Fire at Braddock's Meter-Works.—Last Friday week there was an outbreak of fire (which unfortunately had serious results) at the Globe Meter-Works, Oldham—Messrs. J. & J. Braddock's branch of Meters Limited. The fire started in the oil store-room; and on the alarm being given, a number of workmen went to the spot. Three of them started to remove to a place of safety a barrel of turpentine which was alight at one end; but the barrel burst, the clothes of the men became saturated, and they were at once enveloped in flames. One of the men subsequently succumbed to his injuries; while the other two were seriously hurt. The fire was extinguished before the flames had spread beyond a workshop adjoining the store-room and a testing-room on the second-floor; but the damage done was considerable.

LEGAL INTELLIGENCE.

GLAMORGAN ASSIZES, CARDIFF.—Thursday, March 30.

(*Before Mr.* ENGLISH HARRISON, *K.C., Commissioner, and a Jury.*)

Jones v. Browning.—A Gas Manager's Libel Action.

A case of considerable interest to those employed in the gas manufacturing industry was commenced at the Glamorgan Assizes, Cardiff, to-day, when Mr. Isaac Jones, for nine years Working Manager of the Bryncelyn Gas Company, Pontardawe, Swansea Valley, brought an action for alleged libel and slander against Mr. Robert Alexander Browning, who is Secretary and Managing-Director of the Company, and Manager of the Neath Gas Company.

Mr. ABEL THOMAS, K.C., M.P., and Mr. PEFRYAT EVANS appeared for the plaintiff; Mr. S. T. EVANS, K.C., M.P., and Mr. VILLIERS MEAGER represented the defendant.

The plaintiff's case was to the effect that defendant asserted, by speech and pen, that plaintiff had neglected his duties and mismanaged the affairs of the Company, in consequence of which he had been summarily dismissed; that before leaving the works he had maliciously stopped the supply of gas; that he had been guilty of criminal offences; and that he was not fit to be employed in any position of trust and confidence. Defendant was alleged to have written several letters to the Clerk of the Rural District Council, in one of which he said: "After what I have stated, I would sincerely advise you to dispense with the services of your lamplighter [a son of plaintiff] at once, both for your interests and ours."

Plaintiff, in the witness-box, said that as Working Manager of the Bryncelyn Gas-Works he was under the immediate orders of the defendant. Up till 1897, relations were smooth enough; but then witness, in the presence of Dr. Griffiths and Mr. Hopkin, said he wanted new retorts. Defendant replied that only eighteen months previous the Company had spent a lot of money on retorts. In stating what occurred, witness said: I laughed; and Mr. Browning said: "What are you laughing at. It will not take long to shift you." "Lump it," I said. After that, Mr. Browning used to come to the works and would curse and swear about the place. Continuing, witness said that there were frequent disagreements after this; and in the end he received notice. When he left, the works were in perfect order.

Cross-examined by Mr. S. T. EVANS, witness stated that after he received notice Dr. Griffiths told him to ignore it. On Dec. 1, he received a letter from defendant threatening proceedings unless he satisfactorily explained several obstructions which had been found on the works, and which completely stopped the gas supply. Some bricks which were in the flues must have fallen there or been placed there by someone.

Mr. EVANS: Who did you think could have put them there?

Witness: I do not blame anyone.

Was it Mr. Browning or the new Manager?—I do not say anyone.

It was very astonishing?—Yes; just as I left the works.

The morning after you left, ten bricks were found in the flues?—I left the works in perfect order.

Witness admitted that it was extremely strange that five bricks should be found in one flue, two in another, and one in a third. It would make him think someone had put them there; but he would examine into the matter first. He admitted that Pontardawe was in complete darkness for three nights; but he did not go to the works to inquire into the cause.

Mr. *Ellis Jones*, plaintiff's son, also gave evidence.

Mr. *C. B. Jenkins*, Clerk to the Pontardawe Rural District Council, said that six days after plaintiff left the works defendant called at his office, and in a loud voice exclaimed: Before Isaac Jones left, he and his son put some bricks in a flue, which was the cause of the failure of the gas supply. I am going to prosecute Jones for it." Witness advised Mr. Browning not to say such things, as he considered they were slanderous; and to this defendant replied: "I don't care; I want to make them public."

Dr. *Griffiths*, J.P., of Pontardawe, a Director of the Company, gave corroborative evidence. He said that on one occasion defendant, when speaking of plaintiff, was in a towering rage and applied foul terms to almost everyone. Defendant once referred to Jones as "the d—— fool that he is; I have a great mind to shove him into the tar-boiler or the retort, and make gas of him." (Laughter.)

Cross-examined by Mr. EVANS, witness said that since the plaintiff's dismissal he (Dr. Griffiths) had washed his hands clean of the business, though during plaintiff's term of office witness had exercised considerable power. He first saw the suggestion about plaintiff and the bricks in the flues in a Swansea newspaper.

Mr. EVANS: Is this a quarrel between you and Mr. Browning?

Witness: I do not think so.

Are you not to pay part of the costs in this action?—Not a penny piece.

But you got Isaac Jones to look over the back wall?—I wanted him to see if the man was there who came before when the gas failed.

Why did you not, as Chairman of the Company, walk openly into the works. You had a duty to the shareholders as well as to yourself?—I told the Directors that I would not work with anybody else when Jones left.

Mr. *Elias Morgan*, Contractor, of Landore, said the retorts were in a dilapidated condition, and it was just as possible for the bricks to have got into the flues by accident as by design. If by design, they would hardly have been placed as they were found.

Mr. EVANS, for the defence, said that Mr. Browning did not bear the plaintiff any ill will. He did not even know who put the bricks in the flues; but it was impossible to avoid the conclusion that somebody placed them there.

Defendant then went into the witness-box, and said that plaintiff always turned round and "cheeked" him, as though he had no right to speak to him. Things at length became so unsatisfactory that the Directors decided to appoint a new Working Manager.

Friday, March 31.

On the resumption of the proceedings this morning,

Mr. *Forbes*, the present Manager at the Pontardawe Gas-Works, expressed the opinion that the bricks were placed in the flues by someone, and similar evidence was given by *W. Wakeley*, foreman stoker at the Neath Gas-Works, *W. Chappell*, foreman to Messrs. R. & J. Dempster, and *James Balsle*, smith at the Neath Gas-Works.

Mr. ABEL THOMAS, in addressing the Jury, said the action was not brought with the object of obtaining large damages; but if they found that the plaintiff was entitled to a verdict, they must consider what was the proper manner in which to express their opinion as to the aspersions cast on Mr. Jones's character. Therefore he presumed, if they found a verdict for the plaintiff, the damages would be substantial. If nonimal damages only were given, people might think that the character of Mr. Jones had not been vindicated.

The LEARNED COMMISSIONER, in summing up at considerable length, pointed out that it was very evident the defendant was dissatisfied with the plaintiff from 1896 onwards; and, to put it mildly, they were not on particularly good terms. There seemed to be an agreement that the bricks had been placed in the flue; and if the defendant had confined himself to asserting that they had been found there, he would have been perfectly justified in writing explanatory letters. But the plaintiff alleged that advantage had been taken of this to make derogatory statements about him. If this was true, and defendant was actuated by personal spite or ill-will, it would amount to express malice; and he would be responsible unless he could prove the allegation true.

The Jury, after an absence of twenty minutes, found a verdict for the plaintiff, with £40 damages. Judgment was given accordingly.

A Water-Main Rating Dispute.

At the Knaresborough Petty Sessions last Wednesday, the Knaresborough Urban District Council sought to recover from the Harrogate Corporation £112 16s. 9d., general district rate. The matter in contention was as to whether the Harrogate Corporation were liable to be assessed by the Knaresborough Urban Council for the water-mains and service-pipes belonging to the Corporation lying within the Council's area, and used for the supply of water to Knaresborough from the Harrogate reservoirs. The Corporation did not dispute the accuracy of the assessment or the amount of the rate; they simply denied the right of the Council to assess the mains and pipes at all. The Knaresborough Bench had previously made an order for payment of the poor-rate; and an appeal to Quarter Sessions against the decision is pending. Mr. Gilling, who appeared for the Council, said it was pretty well understood that whichever was the unsuccessful party in the appeal to Quarter Sessions, the matter would not rest there. Each party was prepared to go to the higher tribunal, and if necessary to the House of Lords. He asked for an order for payment, and said the Corporation would have their remedy, and, if successful, would be entitled to get the amount back again. The Town Clerk of Harrogate pointed out that the mains and pipes had been in existence for upwards of a hundred years, and had never been rated. He, however, ultimately announced that the parties had agreed out of Court to the summonses being withdrawn; the amount to be paid under protest, and the Council to undertake to refund the money if the appeal was successful.

A Case Regarding the Use of Water in Hotel Stables.

At the Lexden and Winstree Police Court a few days ago an interesting case was heard, in which a Brightlingsea fishmonger, named Brasted, was summoned for using the Urban District Council's water without being supplied by them. It was explained that defendant owned a pony and trap, which he stabled at the Royal Hotel yard. He had been using the Council's water for a very long time before they discovered it. Then they sent the Inspector, who warned defendant that he would have to pay 9d. a quarter. The hotel tenant (who was not defendant) paid quarterly, on an assessment of £92, the sum of £1 12s.; but this was only for water used for domestic purposes. The assessment covered the charge for casual use of water by people who put up at the hotel for an hour or so; but defendant kept his pony and trap there for a long period. For the defence, it was stated that defendant had rented a stall at the Royal Hotel, and a place for his cart, for 2s. 6d. a week; and it was understood that such water as the pony required would be at his service. Nothing had been said till two months ago, when defendant was told he would have to pay 9d. for the water. The amount, said his Solicitor, was nothing, but the principle involved was quite a large one—large enough to take to the Court of Appeal, if needs be. In Colchester, dozens of hotels had stables which men hired for a certain time—by the week or the month—and no charge had ever been made for water in respect of such occupancy. An inclusive charge for water was made on the whole hotel, the stables, and yard; and it was preposterous to suggest that because a man stabled his horse and cart there he should be made to pay another charge. As to the suggestion that the water was being used for business purposes, no business was carried on in the hotel yard. The case was dismissed; defendant being allowed a guinea costs.

Reductions in Price.—The Nelson Corporation have decided to reduce the price of gas 6d. per 1000 cubic feet. This reduction also applies to the townships of Brierfield and Barrowford, which are supplied by the Corporation; but at Wheatley Lane the price will only be lowered 3d. The Arundel Gas Company have reduced the price of gas 1d. per 1000 cubic feet, and the Sutton Gas Company 2d.; the reduction in the latter case taking effect from the beginning of the year.

MISCELLANEOUS NEWS.

ALLIANCE AND DUBLIN CONSUMERS' GAS COMPANY.

The Half-Yearly General Meeting of this Company was held last Friday—Mr. CHARLES LAWLER, J.P., in the chair.

The SECRETARY and MANAGER (Mr. F. T. Cotton) submitted the report of the Directors for the half year ended Dec. 31, 1904. They stated that the gross revenue was £154,109; and the expenditure, including debenture interest, &c., being £119,056, there was left a balance of £35,053. To this had to be added £5039 brought forward; making the total available for distribution £40,092. The Directors recommended the payment of the usual dividends of 10½ and 7½ per cent. per annum on the respective shares, which would absorb £35,126; leaving £4966 to be carried forward.

The CHAIRMAN, in moving the adoption of the report, said the Company had sold in the half year covered by it 757,292,000 cubic feet of gas, which was a decrease of 5,478,000 cubic feet compared with the sale in the latter half of 1903. This falling off had been caused by the use of incandescent gas-burners, and the prevalence of mild, bright weather during the last months of the year. For the gas sold there had been received £132,833, which was a decrease of nearly £6000, caused by the reduction of 2d. per 1000 cubic feet in the price of gas which came into force on the 1st of January. A sum of £2507 less had been received for residuals, owing doubtless to the great dulness of trade. The demand for slot meters continued—showing the very great benefit and convenience they were to those who used them. The Company sent out during the past year 3035, and had now in use 19,818, compared with 16,783 at the close of the corresponding half of 1903. The number of cookers in use was 18,920, compared with 16,466 in the corresponding period; showing an increase of 2454 for the year. The Company had introduced the "self-intensifying lamp," which gave a light equal to from 150 to 600 candles, and was most suitable for churches, shops, large rooms, or any place where a brilliant light was required. These lamps were giving the greatest satisfaction to all who were using them.

Mr. MAURICE BROOKS seconded the motion.

Mr. MAGUIRE called attention to the fact that the Company had a reserve fund of £60,306, but only £43,076 invested. Then there was an overdraft of £18,000 due to the bankers, the interest on which amounted to £700 or £800 a year.

The CHAIRMAN said the shareholders might rely upon it that the investments were all of first-class character. This, however, was a matter which must be left to the Directors.

Alderman COTTON explained, with reference to the overdraft, that the Company paid on an average 4 per cent. for the money, and if they did not get an overdraft they would have to raise capital and pay 7½ per cent. for it. With regard to reserve, the portion not invested was being used in the same way that they were using the working capital; and if they invested it, they would only get 4 per cent. Therefore, as regards these two sums—the overdraft and the portion of the reserve fund not invested—if they did not use them as they were doing they would have to call up additional capital, which would cost 7½ per cent. What was done was simply with a view to economy.

The motion was carried, and the dividends recommended were declared.

In the course of the remarks accompanying the votes of thanks, approval was expressed at the way in which the officers discharged their duties.

The SECRETARY and MANAGER expressed his thanks on their behalf; and the proceedings closed.

BRITISH GASLIGHT COMPANY, LIMITED.

The Half-Yearly Meeting of this Company was held last Wednesday at the London Offices, No. 11, George Yard, Lombard Street, E.C., Mr. J. HORSLEY PALMER in the chair.

The SECRETARY (Mr. H. B. Chamberlain) read the notice calling the meeting, and also the report of the Directors for the six months ending Dec. 31, together with the accounts of the Norwich station, to comply with the statutory requirement. The following is the report:—

The Directors submit the half-yearly accounts of the Company to Dec. 31 last, as examined and certified by the Auditors, who have also vouched for the correctness of the several investments held by the Company.

The available profit is £22,755 10s. 7d., after deducting the following sums, and adding £4189 8s. 1d. from the Hull reserve fund and £5315 0s. 10d. from the Potteries reserve fund; the Parliamentary interest at these stations not having been realized by these respective amounts on the half-year's working. The deductions are as follows: Income-tax, £1870 13s. 6d.; Trowbridge excess profit, £231 15s. 3d.; Hull debenture interest, £2137 10s.; Norwich debenture interest, £1130 10s.; Potteries debenture interest, £665; Trowbridge debenture interest, £166 5s.; interest on debenture stock, £1963 9s. 9d. —total, £8165 3s. 6d.

HULL.—The gas-rental at this station shows a decrease of £1018 4s. 4d., as compared with that of the corresponding period of 1903; the price of gas having been the same at each period—viz., 2s. per 1000 cubic feet. Coke shows a decrease of £882; tar and tar distilling, of £1407; and ammoniacal liquor and sulphate of ammonia, of £205. Coal has cost 12s. 2d. per ton, against 12s. 6d. per ton. Coke has realized 11s. 1d. per ton, against 11s. 11d. The gas sent out was 594,805,000 cubic feet, as against 590,370,000 cubic feet—an increase of 4,435,000 cubic feet, equal to 0·75 per cent. Of this quantity, 46,452,000 cubic feet was sold in bulk to the Corporation for the supply of the old town. The profit realized, after writing off £5000 on account of reconstruction of No. 1 retort-house and coal-store, is £4189 8s. 1d. less than the parliamentary interest. This sum will be taken from the reserve fund, leaving a balance of £31,561 14s. 10d. to the credit of that account.

NORWICH.—The gas-rental at this station shows an increase of £1319; the price of gas having been the same—viz., 3s. 3d. per 1000 cubic feet. Coke shows an increase of £177; and tar and ammoniacal liquor a decrease of £240. Coal has cost 15s. 10d., against 17s. 3d. per ton. Coke has realized 8s. 5d., as against 9s. 3d. per chaldron. The gas sent out was 236,955,000 cubic feet, as against 230,423,000 cubic feet—an increase of 6,532,000 cubic feet, equal to 2·83 per cent. The profit realized after writing off £4100 on account of reconstruction of works and offices is £4188 18s. 8d. less than the parliamentary interest.

POTTERIES.—The gas-rental at this station shows an increase of £34; the price of gas having been the same—viz., 2s. 6d. per 1000 cubic feet. Coke shows a decrease of £137; tar, of £598; ammoniacal liquor and sulphate of ammonia, of £31. Coal has cost 11s. 4d., against 11s. 8d. per ton. Coke has realized 6s. 9d., against 7s. 3d. per ton. The gas sent out was 204,193,000 cubic feet, against 204,492,000 cubic feet—a decrease of 299,000 cubic feet, equal to 0·14 per cent. The profit realized, after writing off £5000 on account of buildings and plant thrown out of use, is £5315 0s. 10d. less than the parliamentary interest. This sum will be taken from the reserve fund, leaving a balance of £21,789 5s. 6d. to the credit of that account.

TROWBRIDGE.—The gas-rental at this station shows an increase of £444; the price of gas having been the same—viz., 3s. 2d. per 1000 cubic feet, with discounts. Residual products have realized £63 less. Coal has cost 15s. 3d., against 15s. 4d. per ton. Coke has realized 10s. 1d., against 11s. 11d. per ton. The gas sent out was 37,779,400 cubic feet, as against 33,828,800 cubic feet—an increase of 3,950,600 cubic feet, equal to 11·67 per cent. The profit realized is £231 15s. 3d. in excess of the parliamentary interest. This sum will be invested, making the reserve fund £1655 11s. 4d.

HOLYWELL.—The gas-rental at this station shows a decrease of £113, owing to the price of gas having been reduced from July 1, 1904. Residual products realized £57 more. The profit is £348 3s. 1d.

The available profit, added to the previous balance of profit and loss, amounts to £55,166 6s. 2d. From this sum the Directors recommend a dividend at the rate of 10 per cent. per annum, clear of income-tax. This will amount to £23,000, and leave a balance of £32,166 6s. 2d.

THE NEED FOR CAPITAL EXPENDITURE AND WORKS EXTENSION AND RENEWALS.

The CHAIRMAN said, in moving the adoption of the report and accounts, he should perhaps detain the shareholders a little longer than usual on this occasion, because he had several points to speak about, as the accounts and report differed somewhat from those of previous half years. He had received several letters from shareholders who had remarked on the accounts, and were under the impression that, because the Directors had been obliged to take sums of money from the reserves at two of the stations, that the Company were in a somewhat bad way. He wished, if possible, to disabuse the minds of the shareholders of this in the remarks he now had to make. As he had told them on several previous occasions, they had been engaged at Hull, at the Potteries, and at Norwich in very extensive renewals of their old plant. At Hull, they had been obliged to entirely rebuild one of the retort-houses, which were erected over 50 years ago. At Norwich, owing to the very cramped position of the works, they had had to go to very great expense in moving the purifiers from one site to another, and also in rebuilding some very old retort-houses to meet the increased business at that station. At the Potteries, those of the shareholders who had read his remarks with regard to that station at the previous meeting, would remember that they had been very much injured by the operations of the iron and coal mines in the district, which had necessitated their moving practically the whole of the Etruria works, with the exception of two or three of the gasholders, to a new site, where they hoped they would not be injured in any way by the falling in of the ground. The new site was close alongside the railway; so that they would have facilities for handling coal and other materials much cheaper than at present. But all these works were in the shape of renewals; and they could not be charged wholly to capital. They took the place partly of what existed under the head of capital; and therefore it would be necessary, over a period of several half years, to write off the cost of these renewals against revenue; and for this very purpose the Directors had during many half years accumulated funds, which were set out in their accounts under the head of reserve funds, and which last half year amounted at Hull to £36,000, at the Potteries to £26,000. Now, with reference to the individual stations, he should like to make a few remarks—first of all with regard to Hull. Hull was one of those places (being one of the great ports of England) which felt very acutely the ups-and-downs of trade; and during last year there was certainly not that extension in the Company's business which they generally expected at a growing place like Hull, and which they had always hitherto experienced. But he believed this was only temporary, and that as the trade of the country got into a proper state again, they would once more realize their usual percentage of increase. The increase, as stated in the report, was hardly 1 per cent., which, of course, was very small. A great decrease had taken place in the case of their large consumer—the Corporation of Kingston-upon-Hull. The Corporation took from the Company every year a large amount of gas in bulk; and it was principally in the Corporation district that the falling off had taken place. The actual figures were these: The town took 2½ million cubic feet less in the past half year than in the corresponding six months of 1903; and in their own district there had been an increase of 7 millions, so that the shareholders would see the falling off had been really in that portion of Hull over which the Company had no control whatever, and in which therefore they had not the right to canvass, it being entirely in the hands of the Corporation. At the same time, there was a decrease in rental. This was caused, first of all, by the reduction which they thought fit to make in the meter-rents. This accounted for £500; and there was also a decrease in rental owing to the new arrangement of taking the slot meters only once a quarter instead of twice. But this would right itself during next half year. Of course, they had been hit like other companies by the lower prices of residuals. Coke was 10d. less, and pitch (which they used to sell at such extraordinary prices at Hull, and which was 53s. 6d. in the corresponding half year) had only netted 31s. in the period under review. In regard to the new works, and the renewals that had been going on at Hull, three of the Directors—Major-General Corrie, Mr. Wilkinson, and himself—paid a visit to that station only about a month since. They found the new retort-house in action, and working exceedingly well. The coal-conveyor was also acting well; and he believed they would be able to make gas at the station very economically in the future. It had been the intention of the Directors to proceed this summer with the renewal of No. 2 retort-house, which

was of the same age as No. 1 house; but looking at the fact that the quantity of gas sent out and sold did not show very much prospect of a large increase at the present moment, and that the Directors did not wish to incur any more capital outlay than they could possibly help, they were going to defer that expenditure until next year. He might say, with regard to Hull, that if it had not been for the large sum they had been obliged to take out of the reserve fund on account of renewals, the absolute profit would have been in excess of the parliamentary interest allowed; and they would have had something like £800 to place to reserve fund. So that really, on the ordinary working of the concern, apart from the renewals, they had made an excess of profit. With regard to the Potteries, he gave the shareholders on the last occasion very full particulars concerning the new works they had established there. These works had been working satisfactorily through the past winter. The retort-house at the old station had been closed down; and they were now making the gas entirely at their new works by the side of the railway. Business at the Potteries, he was sorry to say, was in a very slack state. He was sure that Mr. Corbet Woodall would bear him out in this—that trade was as bad as had ever been known in that district for a great number of years. The prices of gas at the Potteries were 2s. 6d. and 2s. 3d., which were the lowest in the district; and their profits at that station worked out on the present occasion at only £315 less than the parliamentary interest allowed. But they had drawn from reserves £5315 to meet the renewals which they had been obliged to embark upon. At Norwich, he was glad to be able to report, the ordinary working, apart from the question of renewals, came to only £88 less than the parliamentary interest. It was very satisfactory for the Directors to see this, because it showed them that, when they had finished writing off the cost of the renewals, it would be possible to work at Norwich almost, if not quite, up to the parliamentary interest they were allowed to take. This was, he thought, a very satisfactory feature indeed. At this station, they had to go to a great deal of expense; but the Directors hoped before long the corner would be turned, and that they would be able to get nearly, if not entirely, their full parliamentary interest, even if they did not get what they were entitled to—that was, their back-interest, which had now accumulated to a very large sum. The new works at Norwich were completed, with the exception of a small portion of the second part of the retort-bench. The first part of the bench had been working satisfactorily throughout the past winter; and the second part would be finished in the course of the spring. They had abandoned the use of lime for purification there. It had resulted in the avoidance of nuisance to the neighbourhood; and—he would not say a considerable profit to the Company, but they had been able to make their gas rather more cheaply in consequence. But above all, it had done away with what was a constant source of annoyance to the Company, through the complaints of their neighbours. At Trowbridge, the shareholders would have noticed that the increase was very satisfactory. They were reconstructing the remaining portion of the retort-bench; and he thought this would make the station complete for many years to come. As to the little station at Holywell, they had made a large reduction in the price of the gas. It used to be 5s. 6d. per 1000 cubic feet; and they had come down to 4s. 9d., with special prices for large consumers. This was only a small place; but it showed signs of an increased consumption, and he hoped it would still go on progressing. This completed the remarks he had to make concerning the stations; but there were one or two other matters he should like to speak about—the first being the capital of the Company. No gas company, as the shareholders were aware, could stand still. There were always extensions to be made in all directions; and capital expenditure was perpetually going on in the way of mains, meters, and the fitting up of houses. To give them some idea of the way in which capital went on increasing, he might say that at Hull during the half year they fixed 919 slot meters, which brought the total of the slot meters there up to 11,779. The increase in the number of houses supplied with fittings was 656. Again, at Norwich they had a considerable increase in slot meters; the number being 946. In stoves, too, the increase was 743, and in houses fitted up 873. And so capital expenditure went on at every station. But he was glad to report that most of this business was of a very satisfactory nature; and this would be seen when he said that the average annual consumption of the slot meters at Hull was 11,900 cubic feet, at Norwich 10,523 cubic feet, at the Potteries 10,310 cubic feet, and at Trowbridge 11,000 cubic feet. Such business as this could not, of course, be met without capital; and therefore the time had come when the Directors thought it was absolutely necessary that further shares should be issued. It had always been their practice to offer new shares in the first instance to the shareholders. The Directors therefore proposed, on the date on which they sent out the dividends, to enclose with the warrant a form of application for shares; and they hoped the shareholders would respond so that the 1500 shares which it was proposed to issue would be rapidly taken up. The price at which the Directors intended to issue the shares was £40, which was somewhat under the present market price, and would receive the full dividend for the half year ending June 30 next. On the last occasion of their meeting, one or two of the shareholders were kind enough to remark upon the work that was done by the Directors of the Company; and, in replying to the vote of thanks, he (the Chairman) pointed out that the work devolving upon the Board during the last ten years had much increased. The capital, he might now say, had increased in the last ten years by 65 per cent., and the business of the Company had also advanced by nearly a similar amount. But not only had their work been of a more anxious character through the increased responsibility, but, owing to the restrictions under which they were placed by their Acts of Parliament with regard to the interest they were allowed to earn at their different stations—namely, 5 per cent. on the ordinary capital and 4 per cent. on the mortgage debentures—it had been, during the last two or three years, increasingly difficult to obtain money at such a low rate of interest that it could be profitably employed. There were one or two financial gentlemen in the room who would bear him out that in the last two or three years the value of money had been increasing; and therefore it had been correspondingly difficult to raise money at as low a rate of interest as they formerly did. As the shareholders would see, the earlier issues of mortgage debentures were at 3 and 3½ per cent. The Directors had now much greater difficulty in raising money, and also had to exercise the greatest care in the expenditure of the money at the different stations, so that interest might be properly earned. The gentleman who proposed the vote of thanks at the last meeting also kindly suggested that the Directors should receive some addition to their remuneration. This, of course, was for the shareholders to decide. However, he did not want to make any more remarks on this subject, except to say that if the shareholders would turn to "Field's Analysis," which gave the details of what was paid to the Directors of the London Gas Companies and the neighbourhood, they would find that the Board of the British Gas Company were paid less than half that of any of the Directors of the Companies in the suburbs doing a similarly large business. There were quite a number of them shown in the list; and the Boards were being remunerated to the extent of 0·50d. per 1000 cubic feet sold, while the Board of the British Gaslight Company only received 0·20d. per 1000 feet.

Mr. Frededick Wilkin seconded the motion.

Mr. Louis Penny inquired if the loss at Kingston-upon-Hull was a permanent or a temporary one. He would also like to be informed as to what was the present remuneration of the Directors, what was intended to be the increase, and whether the number of Directors was the same now as when the Directors' remuneration was fixed ten years ago.

The Chairman said he was afraid Mr. Penny was not a very old shareholder, or he would not have asked the question about the Corporation. The Corporation extinguished the gas-works (which did not belong to this Company) in the portion of Hull known as the Old Town. They then applied to this Company to supply them in bulk at a low price for the supply of the district. Being on friendly terms with the Corporation, after several interviews with the Chairman of the Corporation Gas Committee, the Directors agreed upon a price at which they could supply in bulk through a meter fixed at the boundary; and on those terms—18d. per 1000 cubic feet—they had supplied the Corporation for the last six years. They could not regulate the amount of gas that the Corporation took. They purchased just as much as they required; and it so happened that during the past half year they had taken 2½ million cubic feet less. Whether they would take more next half year, of course the Directors could not say. They supplied private people in their district, as well as the public lamps; and the Company simply delivered the gas to them in bulk. Respecting the remuneration of the Directors, it was fixed at £1500 ten years ago. He believed the idea of the gentleman who had introduced the matter was to raise it by £500. The number of the Directors had, he believed, been the same ever since the Company was instituted in 1824.

The motion was unanimously carried.

Proposed by the Chairman, and seconded by Major-General Corrie, a dividend of 20s. per share was declared, free of income-tax.

The Directors' Remuneration.

Mr. A. G. Burney then moved that the remuneration of the Directors be increased from £1500 to £2000 from the 1st of January last. He said he thought it was a subject for congratulation by the shareholders that circumstances justified (as those of this Company undoubtedly did) the moving of a resolution of this description, because it was an indication not only of advancement and prosperity, but also of the measure of success with which they had been favoured, and which might be reasonably expected to continue. He thought it was desirable that the shareholders should from time to time review the statistics of the Company from the point of view of the duties and responsibilities which devolved upon the Board as distinct from those statements of finance and current working which they were accustomed to hear from the Chairman at their half-yearly meetings. The remuneration of the Directors was last altered ten years ago. The capital expenditure of the Company had increased during the ten years by something like £467,000—that was to say, by something more than half. The present capital expenditure amounted to £1,183,383; but there was a further point to be remembered, that the last addition to the remuneration of the Directors was made after the long period of thirty years. In the year 1860, the remuneration of the Directors was raised from £650 to £1000. There was another point which had been adverted to by the Chairman, and of which they ought not to lose sight—that was, that the remuneration of the Directors was based upon a much lower ratio than that of companies the volume of whose business could not be compared with that of the British Gas Company. He (Mr. Burney) did not think they ought to allow such a position to continue any longer than it had done. He thought, too, he might assume from the small number of shareholders present representing a large body of shareholders, that the majority were in favour of the passing of the resolution he had to propose that day.

Mr. Graham Wilkin seconded the motion; and it was unanimously carried.

The Chairman heartily thanked the shareholders for this tangible evidence of their appreciation of the services of the Directors. If he might be allowed to say so, he thought the Directors deserved it. Every member of the Board was always ready—the point of personal inconvenience never entered into consideration—to visit the stations of the Company when any question arose which required the presence of the Directors—whether it was Hull, the Potteries, or Norwich. The experience, too, that some of them had had in gas administration—especially in the case of Mr. Woodall—was always fully devoted to the interests of the shareholders. He heartily thanked the mover and the seconder of the resolution; and the shareholders generally for their endorsement of the proposal.

Votes of Thanks.

Moved by Mr. Alfred Featherstone, and seconded by Mr. A. W. Oke, a vote of thanks was passed to the Directors for their services during the past half year.

The Chairman having responded,

Mr. Corbet Woodall moved a vote of thanks to the Secretary and officers. He thought the admirable summary of the work of the

Company they had had from the Chairman was almost a sufficient introduction to this vote. It was rather singular that, at one and the same time, their works at Hull should be in process of reconstruction partly because of municipal improvements; that their works at the Potteries should be in process of reconstruction by reason of the subsidences that had taken place there, and over which the Directors or the Engineer at the works had no control; and at Norwich, again partly due to municipal reasons, and partly because the growth of the business of the Company required it, they had had to move certain sections of their works, as otherwise they might have become in some degree offensive to the neighbourhood. All these things had come upon them at one and the same time. That the Company were pulling through these heavy costs as well as they were doing, must be a matter of gratification to the shareholders, as it was to the Directors. It was certainly evidence that their staff had risen to the occasion, and were well equal to the emergencies. With regard to the London staff, everybody connected with the Company knew how admirably the work was carried out. Mr. Chamberlain was, in fact, a perfect encyclopædia with regard to the proceedings and work of the Company.

Mr. R. S. Gardiner seconded the motion; and it was heartily agreed to.

Mr. Chamberlain having, on behalf of himself and fellow officers acknowledged the vote, the proceedings terminated.

SAN PAULO GAS COMPANY, LIMITED.

A Progressive Policy—Fourteen Candle Gas and Public Incandescent Gas Lighting.

The Annual General Meeting of this Company was held last Thursday, at Winchester House, Old Broad Street, E.C.—Mr. D. M. Fox in the chair.

The Secretary (Mr. G. H. Rogers) read the notice convening the meeting. The report of the Directors and the statement of accounts were taken as read.

The Chairman said he thought all the shareholders would agree with him that the Directors met them once more with a thoroughly satisfactory report, and that the balance-sheet and revenue account showed that the Company were never in a sounder financial position than at present. As he had informed the shareholders at their last annual meeting, during 1903 the effect of the new contract with the Government was only partially realized; but during 1904 they had been in full work under all the conditions of the contract. The effect of this had been: First, the illuminating power of the gas had been 14 candles, as against 17 candles; secondly, the price of gas had been, for public and private lighting alike, 140 reis in gold, as against 170 reis per cubic metre, and for non-lighting purposes at 105 reis per cubic metre; and, thirdly, the whole of the city had been lighted by the incandescent system. The results of this change had been satisfactory. They had not only maintained their position, but had materially improved it. The net profit had increased by £1600; and after placing £3000 to the reserve fund, the Directors were enabled to recommend a dividend of 4 per cent., making 7 per cent. for the year, and to carry forward the substantial balance of £3399. Of course, as was anticipated, the Company had sustained a considerable loss of revenue under the head of public lighting. Although 113 new lamps were fixed, and 30,000 cubic metres more gas consumed in the public lamps, still, owing to the reduced price, the receipts from this source had been £3209 less than in 1903. There had been an equivalent saving to the State Government; and the fact remained that the City of San Paulo was one of the best lighted cities, if not the very best, in the world. It had been demonstrated there that gas, when properly used, was more suitable for street lighting than electricity. But the Company's loss by the reduction of price had not only been the public gain, but, as was usually the case, the forward and liberal policy of the Directors had secured the Company a rental from the public lighting of £24,000 a year, in spite of electrical competition; and they might look forward with every confidence for still better results. It was, however, in the private lighting where the greatest advantages had been found, because consumers with 14-candle gas at 140 reis per cubic metre could obtain light at less cost than from electricity. The number of private consumers had increased by 789; making the total 6840. The gas sold to the private consumers showed an increase of 10 per cent., or £3702 in cash, of which excess £1404 was for gas supplied at the reduced price for cooking and heating. This branch of the Company's business was growing rapidly. There was also a satisfactory improvement in the receipts from coke and residuals generally. Considerable attention had been given to retailing coke, and showing customers the advantage it possessed as fuel for domestic purposes, with the result that there was a satisfactory increase from this source of revenue. Steps were also being taken to show the many uses to which tar could be put. In these matters their Manager (Mr. Gray) and his staff had shown much energy. Under the new contract, the Company accepted onerous conditions; but the Directors were convinced that a liberal policy was wise in the Company's interests. Fortunately, the general conditions during the year had been favourable. Coal and freights had been low, exchange had been steady and favourable (making the price of gas in currency cheap), and business in the city had been prosperous. He might here perhaps remark that the impression seemed to have gained ground that the higher the exchange, the better for the Company; but a little consideration would show this was not exactly true. The Company were on a gold basis. Their receipts for gas, whether for public or private lighting, were regulated entirely by the exchange, and they always got the price in currency, which rose or fell just in proportion as the exchange rose or fell. But the price in gold remained always the same with the Company. It was very easy to understand, therefore, that, with a high exchange, their working expenses—that was, all the expenses incurred in currency, on the other side—increased relatively, because, of course, the pound sterling purchased fewer milreis. This, he thought, would convince people that, being on a gold basis, it did not necessarily follow that the higher the exchange the better for the Company. Such advantageous circumstances, however, as cheap coals, and freights, and so on, might not always exist; and the Directors consequently proposed to add £3000 to the reserve account, which would then stand at £39,000. The Directors had started a sinking fund in order to meet when they fell due a part of the debentures which the Company had issued; and for this purpose £1011 would be appropriated annually. During the year, the Company had acquired some plots of ground adjoining the works (which might be required for future development) at a cost of £2847. There had also been expended on new mains and enlargement of existing ones, including the amount in suspense last year, £13,934. These amounts, with £751 for new lamps and £810 for new services and meters, were the only charges carried to capital. The development of the Company's undertaking in San Paulo, and the increasing importance of the business, rendered it advisable that Mr. Gray should have at the works the assistance of a competent Engineer to attend to all technical matters; and the Board selected Mr. Whyte, a gentleman trained in the service of the Gaslight and Coke Company, who they had every reason to believe would fully realize the expectations of the Directors. Indeed, he was pleased to say he had already given ample proof of his ability and zeal. He was glad to be able to say that their relations with the State Government and officials of San Paulo continued to be on a most friendly footing. It would be seen from the revenue account that, while coal cost £36,261, against £37,924 the previous year, gas realized £79,208 against £78,715, notwithstanding the reduced price of the gas supplied to the public lamps. The repairs of mains were £10,147 this year, against £5590 the previous year, in consequence of the many replacements, and the expenditure on public lighting was about £1000 more. All other charges remained much the same, except that the balance of profit was £25,096, against £23,497 the preceding year, which, added to £3312 brought forward, made a disposable balance of £28,411. It was proposed to dispose of this as follows: After paying interest on debentures (£3500), redemption of debentures (£1011), and the interim dividend paid of 3 per cent. (£7500) they proposed to place to reserve fund £3000, to pay a dividend of 4 per cent. (which would absorb £10,000), and to carry forward a balance of £3999. From information received up to date, the profits for January and February this year showed an increase over those of last year of nearly £1000. He felt sure now that they had got the new contract fully in working order, every year in the future would be better. Although a serious matter, the revision of the contract was the only thing to do; and they had secured their position in San Paulo in spite of powerful competition. He concluded by moving the adoption of the report and accounts.

Mr. John Barker seconded the motion.

Mr. Neish asked whether the reserve fund of £36,000 was invested in separate securities, or was in the business. He was glad to see that this year again a substantial amount had been set aside. He was certain the shareholders would endorse this policy; and he hoped the Board would continue to follow it.

Mr. F. W. Church inquired the length of the contract that the Company had with the San Paulo Government for public lighting.

The Chairman said, if reference was made to the balance-sheet on the creditor side, there was an item of £15,000 in investments. That was a solid sum; and the rest was used as working capital in the business. As to the contract, it expired in 1927.

The motion was unanimously carried.

Proposed by the Chairman, and seconded by Mr. J. R. Tyndale, a final dividend of 4 per cent. was declared, free of income-tax, making a distribution of 7 per cent. for the year.

On the motion of Major N. H. Webb, seconded by Mr. Neish, the Chairman, who was the retiring Director, was re-elected.

The Auditors (Messrs. Cash, Stone, and Co.) were also re-appointed; and with the usual votes of thanks, the proceedings terminated.

THE GAS INDUSTRY IN SPAIN.

Though many peop'e hold the opinion that electric light and power are driving out the gas industry, the "Revista Minera" has more than once expressed a contrary opinion, and supportcd it by examples from other countries. In a recent issue, this opinion was confirmed by an instance in Spain itself. There are two electricity-supply concerns in Carthagena which are well managed, and do not charge excessive prices. There are also a gas-works which at one time belonged to the Madrid Gas Company, but when the seccnd electricity-works were built, the Company sold theirs to a Spanish Company formed by people residing in the locality and some from Madrid. Ever since the sale, the consumption of gas has increased to such an extent that new settings of retorts have had to be built to double the capacity of the plant; and a gasholder is being constructed having a capacity equal to twice that of the two existing holders. The new Company popularized the use of gas for heating and cooking purposes, and the results of their efforts in this direction are shown by the necessity for augmenting the means of production. The "Revista Minera" thinks some Madrid capitalists may feel interested in this matter, inasmuch as it is time to begin to consider what is to be done in Madrid with a view to supplying gas at a reasonable price when the concession of the present Company (a French one) terminates. It has only nine years to run; and as it will take five years to build new works and lay down the mains, it will soon be necessary to discuss the question whether the supply of gas is to be placed in the hands of a national company or municipalized. In a country like Spain, where business is carried on in such a dilatory style, a period of four years is not a long one for carrying out the preliminaries for the construction of gas-works plant. It is thought the inhabitants of Madrid should understand that the city is one of those in which a well-managed company could sell gas at the cheapest rate. It is pointed out that in a number of European cities the charge is less than 12 c. per cubic metre (2s. 8d. per 1000 cubic feet); and it is believed that it could be sold in Madrid at this rate, and return a profit of 12 per cent. on the capital invested. The present Company charge 30 c. per cubic me're, or 6s. 9d. per 1000 cubic feet—the old Paris rate

LONDON COUNTY COUNCIL AND THE GAS QUESTION.

The Proceedings on the London Gas Bills.

At the Meeting of the London County Council on the 28th ult., the report of the Parliamentary Committee, containing their remarks on the proceedings on the London Gas Bills which were given in the "JOURNAL" last week (p. 860), was presented.

Mr. W. C. JOHNSON, in the course of the discussion of the motion for the reception of the report, said he desired to refer to the London Gas Bills. A Departmental Committee investigated the subject of gas testing in the Metropolis, and made certain recommendations, upon which the Council decided to take action with a view to endeavouring to secure some concessions from the Gas Companies. After considerable discussion and negotiation between the Parliamentary Committee and the Public Control Committee, it was decided to endeavour to secure in Parliament the reduction of 1d. per 1000 cubic feet in the standard price of gas. Without apparently any consultation, without going before a Committee of the House itself, the Parliamentary Committee dropped this matter entirely, on the very weak ground that Counsel thought there was no real support for the change in the report of the Departmental Committee. This was quite true; but the whole plea of the Council was that with the one hand they were making considerable concessions to the Companies, and with the other they asked for this simple concession in return. The Parliamentary Committee went on with the Bill, granting these concessions to the Companies, but denying to the consumers of gas in the Metropolis this reduction in the standard price, which, according to all their financial experts and advisers, they were justly entitled to. The suggestion of the Joint Committees was that there should be a suspension of the forfeitures in respect of sulphur impurity; but the whole of this was gone. Testing for sulphur impurities was altogether abolished.

Mr. A. J. SHEPHEARD (the Vice-Chairman of the Parliamentary Committee) said the Council, in their wisdom—and he nearly always agreed with them—propounded some useful scheme, put it into the shape of a Bill, and asked Parliament to pass it. For the last five years they had had a Parliament which nearly always differed from the Council; and whenever the Council brought forward a scheme, they looked upon it as a great nuisance, and, as a rule, Parliament was inclined to throw it out. The consequence was that when the Council had adopted a certain scheme and referred it to the Parliamentary Committee to carry into effect, they, in talking it over with their Agents and Counsel, came to the conclusion that it was absolutely impossible, in the present condition of the House of Commons, to get the Bill through; and the only question was what must be allowed to go in order to get through a portion of the Bill presented. This was what had happened in the case referred to. The views of the Council had been faithfully put into the Bill which had been introduced. When they came to the House on the second reading, they were plainly told that if they went on with the whole Bill the House would throw it out. The only question was whether at that stage they would agree to let certain clauses go. They did so, and the Bill passed the Select Committee.

PROFIT SHARING AT WALKER AND WALLSEND.

Details of the Scheme.

It will be remembered that at the last meeting of the Walker and Wallsend Union Gas Company, the Chairman (Colonel T. Crawford) announced that the Directors, following the system of other companies, had created a scheme of premiums or profit-sharing among the staff. We have since received from the Secretary (Mr. Charles Armstrong) the following particulars regarding the arrangement. The system adopted does not, it will be seen, put the whole of the staff under the same conditions, but is arranged in accordance with their special duties and the results attained.

Automatic Collectors and Ordinary Meter Surveyors.—These collectors combine the duties of automatic meter collecting and those of the ordinary meter surveying—the automatic collecting taking about two months of each quarter and the ordinary meter inspection about one week of each quarter. With regard to automatic collection, the inducement is in the shape of a premium being given to each collector who completes his work with a higher average of daily collections during the quarter than a required minimum. The standard number of collections required daily by each collector is 40 (quarterly collection); the premium beyond this standard to be at the rate of 1s. per meter. For instance, if at the end of the quarter the daily average should work out at 50 meters, the premium credited to such collector would be 10s.; 55 meters, 15s.; and so on. It should be mentioned that these collectors have their coppers taken from them during the day, which is to the collectors' advantage, as having to take charge of all the money would retard their work. The automatic collectors, in addition to collecting from the prepayment meters, also take up the survey of the ordinary meters; but as it requires only one week during the quarter, a further small consideration only is given for this work. Of course, the more speedily the work is done, the later the date that can be allowed for commencing inspection for the closing of the Company's quarterly accounts; and it also follows that a longer period may be gained for the prepayment collection. The reward for the ordinary meter inspection is that when the number surveyed is above the standard of 110, a premium of 1d. per meter is credited to each man who completes his quarterly survey with a higher daily average number. Any increase in the number of prepayment meters collected daily, and any saving of time in the ordinary meter inspection, point to a smaller staff to control this class of work, thus reducing the average cost per 1000 cubic feet, to the Company's advantage. The results for the past year have worked out in these collectors receiving bonuses of 3·8 to 5·9 per cent. upon their annual salaries; the average daily number of prepayment meters collected being about 25 per cent. over what was done formerly—*i.e.*, previous to the system being adopted. The ordinary meter collection also increased accordingly. The ledger Clerk and Superintendent's premiums in this department are based upon the average of all the collectors.

Ordinary Rental Clerks.—Their duties are to see that everything connected with the gas and meter rentals should be entered and charged, superintending the ordinary surveys, entering up the ledgers, summarizing all gas sales, &c., and being responsible for the collection of all moneys. As the duties of these officials are mostly confined to receiving moneys and keeping the personal gas books and accounts thereto squared, the basis of their reward is reckoned upon the moneys collected at Dec. 31 for each year's revenue ending Sept. 30 (payment day for discount being Nov. 10). A standard was taken representing what could be received without extra effort—viz., 99·50 per cent.—each collector being paid a premium of 1 per cent. on his salary for every 0·10 per cent. up to 99·90 per cent.—viz., standard, 99·50, 1 per cent.; increase to 99·60, 2 per cent.; increase to 99·70, 3 per cent.; increase to 99·80, 4 per cent.; and increase to 99·90, 5 per cent. Bankruptcies and other extraordinary uncontrollable debts (when approved by the Secretary) excepted. The results for the past year were gratifying. The full 5 per cent. was earned by each collector; the aggregate amount collected being 99·93 per cent., and considerably in excess of what had been done hitherto.

Cashier, Accountant, Book-keepers, General Clerks, Inspectors, &c. (Secretary's Staff).—In considering departments, we found it difficult to divide the other members of the staff for any specified basis of reward; and therefore it was found advisable to form a general basis upon the "Annual balance of gross profit—revenue account." It would then be to the interest of all to make best endeavours to increase the Company's profits in whatever department their duties lay. A small percentage of the revenue balance (0·5 per cent.) is set aside to divide among the remaining members of the staff (excepting the Secretary) *pro rata* to their salaries; the condition being that this premium is only paid upon there being a surplus left to the credit of net revenue in each year's account—*i.e.*, the balance left over after the gross profit from revenue has provided for the following obligations: (1) Dividends or reserve fund (reserve fund only provided out of dividends). (2) Interest upon mortgages, loans, depreciation, reserve, and insurance funds. (3) Amount set aside for depreciation funds—*i.e.*, works on leaseholds. The payment, however, is to have preference to any other special provisions such as: (1) Amount set aside for insurance fund (this comes out of surplus profits). (2) Any special yearly charge direct to debit of revenue account crediting capital such as special depreciation upon installations, meters, heating appliances, apparatus, and other removals which can be charged over a term of years.

Works Superintendents and Assistants, Draughtsmen, General Distribution and Outside Foremen (Manager's Staff).—Upon the basis of the "Annual balance of gross profit-revenue account" as per Secretary's staff.

The Secretary and Manager do not participate in the scheme. The results for the past year allowed the maximum 5 per cent.

Payments.—With respect to the whole of the staff, it is a condition precedent to the payment of any premium that the official has performed all his duties to the satisfaction of the Directors. The payment is to be as follows: Half of the sum payable to be paid direct in accordance with the foregoing arrangements; the other half to be transferred to a fidelity account.

Formerly the Company paid on account of their staff a yearly fidelity premium to an Insurance Company of £35; the premium increasing as the staff grew. This has been dropped; and in lieu of it, the Directors have placed £300 to a special account to meet the same purpose as insuring. To this new account is added the other half of the staff's earned premiums; but as it is unnecessary to increase the amount above the £300, the sum in excess of this is redivided among the whole staff, irrespective of departments, *pro ratâ* to their salaries (excepting the Secretary and Manager). This has a double object, inasmuch as it levels half the total earned premiums among the staff generally; and in the case of irregularities the £300 would have to provide the necessary deficiency to square the Company's affected accounts—the staff having to forego half of their earned premiums to bring up the amount again to £300, which must be done before there can be any further division among themselves. By this it means the staff insures against one another.

Malvern Water Supply.—Last Wednesday a statutory meeting of ratepayers was held at the Malvern Assembly Rooms—Sir H. F. Lambert, Bart., presiding—for the purpose of assenting or otherwise to the action of the District Council in depositing in Parliament a Bill to confirm and legalize the construction of certain water-works carried out by the Council for the supply of water to their district, and to authorize them to construct additional works. The Council have, on the advice of Mr. W. Whitaker, F.R.S., and Mr. Burstall, adopted a scheme for boring for water at a place called Bromsberrow, from which the water will be pumped into the existing reservoir at the British Camp. The entire cost of the scheme, including land, is estimated at £20,500, and the annual working expenses at £365, for a yield of 400,000 gallons of water per day. The Chairman gave a brief account of the events which had made an extension of the water supply necessary. He said the cost of the scheme, spread over sixty years, would mean a rate of 2¾d. in the pound, and other work would cost £3600, in addition to which there would be the cost of the Bill, which would be from £800 to £2000. He moved a resolution pledging the support of the meeting to the scheme, which, he said, had received much consideration, and the best advice had been sought. The importance of an abundant supply of water for such a place as Malvern could not be over-rated. The Head Master of Malvern College (the Rev. S. R. James) seconded the motion; remarking that the prosperity of the town depended upon the security of the water supply. Several speakers strongly opposed the scheme; but eventually the motion was carried. A poll of the district is to be taken on the question.

EXTENSIONS OF WELSH GAS-WORKS.

Provisional Order Applications.

A few weeks ago, an inquiry was held at the offices of the Board of Trade, by the Hon. T. H. W. Pelham, one of the Assistant-Secretaries, into an application by the Ystalyfera Gas Company for a Provisional Order to confer upon them statutory powers in regard to their present area of supply, and to enable them to extend it so as to include two other villages higher up the Swansea Valley. The existing area is in the county of Glamorgan, and within the rural district of Pontardawe; that proposed to be supplied is in the county of Brecon, and in the rural district of Ystradgynlais. The Local Authority for this district, being desirous of having a supply of gas, gave their assent to the Order. The Company was formed in 1869; the present capital being £6500, and the proposed new capital £10,000. The area is in the anthracite coal district, and will probably be densely populated when the collieries which are now being sunk are developed. Messrs. R. W. Cooper and Sons were Agents for the Company; and Mr. J. Mogford, the Gas Engineer and Manager of the Briton Ferry Urban District Council, is the Engineer for the scheme. It was strongly opposed by the Pontardawe Rural District Council so far as it referred to their district on the grounds that the maximum price proposed was excessive, that the Council were of opinion that it was more beneficial to the ratepayers that a Provisional Order for lighting the district should not be granted to any one but the Local Authority, and that the Council were desirous of applying for such an Order in respect of their own district and the area mentioned in the Company's Draft Order. At the inquiry, the promoters were represented by a member of the above-named firm, the Chairman of the Company (Dr. J. Newton), and Mr. Mogford; the Council by their Chairman, Clerk, and Surveyor. After hearing evidence, Mr. Pelham decided to grant the Order. The proposed maximum price was 6s. per 1000 cubic feet; that at present charged to ordinary consumers being 5s. 6d. The Company have lately improved their works, and have reduced the price from 6s. 6d. to 5s. 6d. The promoters offered to insert a clause to lay mains to any part of the Council's area, provided they guaranteed 7 per cent. on the outlay; and also to reduce the maximum price to 5s. 6d., provided opposition, which cost the Council £50, was withdrawn. The Board of Trade informed the Council that they are prepared to consider the proposal that a clause should be inserted in the Order in regard to the laying of pipes for public lighting in the portion of the main road which was to be included in the new limits, but in which the mains of the promoters are not at present laid. This matter came before the Council at their meeting last Thursday; and the opinion generally expressed was that no more money should be spent at present. It was resolved to agree to the Order, on condition that the following clauses were inserted: (1) The Company not to charge more than 4s. 6d. per 1000 feet for gas; and (2) to extend their mains to places where the Council desire more light, guaranteeing 5 per cent. on the outlay on mains. Failing the insertion of these clauses, the Council reserve the right to oppose the Order in Parliament.

Application having been made by the Briton Ferry District Council for a Provisional Order to enable them to acquire additional land for gas-works purposes, extend their borrowing powers by £20,000, and utilize £300 for a purpose other than that for which it was borrowed, Major J. Stewart, R.E., one of the Inspectors of the Local Government Board, held an inquiry into the matter, at the offices of the Council, last Tuesday. The Deputy-Clerk (Mr. H. M. Ellis) submitted figures in regard to the area and population of the district, and the outstanding and present indebtedness of the Council. He stated that the authorized capital under their Gas Act had been expended, and that out of the total of £20,000 the sum of £6000 had been repaid. The Gas Manager (Mr. J. Mogford) produced statistics showing that the consumption of gas had increased threefold during the past seven years, and was still augmenting rapidly. The land in the vicinity of the works was being acquired for building purposes, and, unless the Council immediately enlarged their present holding, they would be unable to extend their works on the present site. The new capital of £20,000 would probably be sufficient for 30 years; but the works would have to be extended during the next few years to meet the increasing demands upon them. The sum of £300 which had been borrowed for the purpose of building a Manager's house he proposed to utilize for a new engine, an exhauster, and a washer, plans of which he submitted. The Inspector inquired as to the reason for not having formed a fund for the purchase of the reversion of the land leased under the original Act; and Mr. Mogford explained that the ground landlord refused to sell. It was now his intention, however, to grant a lease for the whole of the lands acquired for gas-works purposes for a term of 999 years. At the close of the inquiry, the Inspector went over the gas-works.

THE PUBLIC LIGHTING QUESTION IN NEW YORK.

Legislative Investigation in Progress.

In previous issues of the "JOURNAL" reference has been made to the above question, which it appears is at present the subject of a public inquiry. According to the last "American Gaslight Journal" to hand, a resolution was passed by the New York Senate on the 14th ult., to the following effect: There is general and widespread complaint in the City of New York of the prices maintained by the Gas and Electric Light Companies operating therein. The Board of Estimate and Appropriation, in December, 1902, adopted a report declaring that the prices charged by the Companies for public lighting were unreasonable and excessive, and that the interests of the Companies had been so combined as to eliminate competition. They accordingly rejected their bids for public lighting. The same prices for electric lighting in all the boroughs, except Manhattan and the Bronx, having been again bid for 1904, and the Commissioner of Water Supply, Gas, and Electricity having, notwithstanding a report of the Engineer of Surface Construction to the effect that the bills were exorbitant and should be rejected, entered into contracts with the Companies for services between March, 1904, and March, 1905, at the prices named. As an excessive price for lighting service in the city involves a great waste of funds, and imposes a wrongful burden upon the taxpayers and inhabitants, it was resolved (if the Assembly concur)—"That a Joint Committee be appointed, consisting of three members of the Senate and four members of the Assembly, which Committee shall, as speedily as may be, proceed to investigate and examine into the organization and operation of the Gas and Electric Lighting Companies; the reasonableness of the charges maintained by the Companies operating in the City of New York for services rendered to the city and its inhabitants, with reference to the cost of the service and the capital actually employed therein; the conditions under which the business of the Companies is conducted, with reference to competition; the quality of the service; the circumstances connected with the negotiation and execution of the city light contracts of 1904; and any other phase of the gas and electric lighting business as conducted in the city deemed by the Committee to be germane to the purpose of such investigation. That the Committee report to the Legislature as soon as possible the result of their investigation, with such remedial measures as it may deem proper." It was further resolved that the Committee should be authorized to require the attendance of witnesses and the production of books and papers. A sum not exceeding $25,000 was appropriated out of moneys in the Treasury for the purpose of the Committee; and, the preliminaries having been arranged, they began their investigation last Thursday.

COLONIAL GAS UNDERTAKINGS.

Letters recently received from the Colonies contained the latest reports of the Brisbane, Maryborough (Queensland), and Wellington (N.Z.) Gas Companies. At the close of the half year ending Dec. 31 last, there was a net amount standing to the credit of the profit and loss account of the first-named Company (including the balance brought forward) of £12,268; and a dividend of 5 per cent., with a bonus of 9d. per share, was recommended. This, with the dividend tax, came to £8453, and left a balance of £3815. The Company have entered into a contract for three years with the Municipal Council for the street lighting. The half-year's working at Maryborough allowed of the payment of a dividend at the rate of 6 per cent. per annum, with a surplus of £264. In the course of the past year, there was a considerable increase in the consumption of gas at Wellington; two outlying districts having been connected. The retort-house was extended at a cost of £11,345 (this amount coming out of revenue); and more than eight miles of new mains were laid Some extensive removals of mains from the roads to the footpaths, owing to the electrical tramway installation, were carried out, at a cost, with duplications, of about £10,000. The balance on the profit and loss account at the close of the year was £17,293; and a dividend of 10s. per fully-paid share for the half year was recommended—making with the amount paid in July £1 per share for the year. The holders of shares partly paid up receive dividends in proportion.

MR. JOHN WEST ON THE ECONOMIC USE OF GAS.

In connection with the gas exhibition promoted by the Southport Corporation, of which some particulars appeared in the "JOURNAL" last week (p. 862), Mr. John West gave, on Tuesday evening, a lecture on "The Economic Use of Gas." He dwelt upon the advantages and superiority of modern burners over the old wasteful burners, many of which, he said, were unfortunately still in use in Southport and other towns. To illustrate his remarks on this subject, he produced some tests, made for him by Mr. Bond, the Corporation Gas Engineer, to show the different illuminating power of the same quality of gas when consumed with various burners. He said the burner recommended by the Southport Corporation was Bray's No. 4, fitted with their No. 7 economizer, which gave the following results: No. 4 burner consuming 5 cubic feet of gas per hour gave a light equal to 9·5 candles; but the same burner fitted with the economizer gave a light equal to 13 candles with the like consumption. He also showed the result of tests of burners taken from consumers' houses where there had been complaints of bad gas. With the above-named consumption of gas, illuminating powers of 1·65 and 2 candles were produced; whereas an incandescent burner would give a light equal to 44 candles with 2¾ cubic feet, and 80 candles with 5 cubic feet—the gas being burned at low pressure. Mr. West explained the structure and action of the incandescent mantle, and referred to the various makes shown in the exhibition. He said these were excellent and economical lights, and very suitable for large halls, shops, street lighting, and other purposes. He gave the results of an experiment in shop lighting he had conducted in Manchester, where, replacing a cluster of eight burners by six incandescent mantles, there resulted a saving in gas of 44·2 per cent., and an increase in illuminating power of 4·28 per cent. Since then he said he had erected a number of large Lucas lights, which were an improvement even upon the clusters of incandescent burners.

In answer to questions, Mr. West said incandescent gas lighting had superseded electric lighting in Government dockyards and other places, owing to its lower cost. He gave a comparison of the two systems. He said the cost of electric lighting per 1000 candles (actual) per hour at 4d. per unit for current was 13·88d.; while gas lighting, taking the cost of gas at 2s. 6d. per 1000 cubic feet, would give an efficiency of 22 candles per cubic foot with the incandescent burner. This, calculated at per 1000 candles per hour, gave the cost as 1·36d. Mr. West commended the action of the Gas Committee in holding the exhibition, and said they were only joining in the forward movement now going on in the gas world to educate the consumers in the proper use of gas. By so doing, they were acting in the best interests of the ratepayers.

ANTWERP WATER-WORKS COMPANY, LIMITED.

The report which was submitted at the Annual Meeting of the Antwerp Water-Works Company, Limited, last Wednesday stated that the income from all sources for the year ended Dec. 31 amounted to £60,284, as compared with £54,325 for 1903; and after deducting working expenses, the cost of laying on services, and London expenses, there was a balance left of £39,280. To this sum had to be added the undivided profit of £3715 brought forward from the last accounts, and interest on investments £935, making a total credit of £43,930. Against this had been charged the debenture interest and income-tax for 1904, the contribution to the reserve account of 5 per cent. on the net profits, discount and commission on debentures £1472, the interim dividend at the rate of 7 per cent. per annum £10,500, the transfer to the sinking fund for the redemption of debentures of £2120 and for that of the share capital of £6250, and Directors' extra remuneration £825. This left £16,580, out of which the Directors recommended the payment of a balance dividend for the six months to Dec. 31 at the rate of 8 per cent. per annum, free of income-tax, making a total dividend of 7½ per cent. for the year. This would absorb £12,000, and leave a balance of £4580 to be carried forward. The Secretary (Mr. J. M. Hamilton) having read the notice convening the meeting, Mr. Easton Devonshire, the Chairman of the Company, moved the adoption of the report and accounts and the declaration of the dividend recommended. He pointed out that during the past twelve months they had had the largest increase for twenty years in the matter of new contracts (1407); while the total increase of water receipts was about £4660. Practically all the new houses in Antwerp now took the Company's water; and the policy which the Manager (Mr. Ad. Kemna) had always recommended, and which the Board agreed with, of putting down the mains in new streets before building commenced, had been very successful. The older houses, too, were coming on more rapidly; and it was in this direction that they had the greatest scope for increase in the future. They had spent about £20,000 during the year on the new works at Luythagen; and they were now almost finished. These works were intended to increase in the most economical way the output of the old works, by enabling them to convert the latter into a low-pressure supply. It had been thought better, rather than increase the pumping power at the existing station at Waelham, to go nearer the city and put down engines of the most efficient pattern. This would save the friction of 9 miles of main; while the new compensations reservoir would allow the old engines to pump steadily day and night, and so secure a larger output with the same power and at the same cost. The Consulting Engineer (Mr. T. P. Wilson) hoped to have the whole of the new works in operation some time before the next hot weather season set in. The £100,000 they were authorized to borrow many years ago was nearly spent; and it would be necessary for the Board to ask for further powers during the next twelve months. The report was adopted, and the dividend recommended was declared.

METROPOLITAN WATER BOARD.

The Fortnightly Meeting of the Board was held on Friday—Sir R. M. BEACHCROFT in the chair.

The Finance Committee reported having had under consideration a memorandum from the Special Arbitration Committee with reference to the payment of the taxed costs of the New River Company in connection with the transfer of their undertaking to the Board. The costs allowed by the Taxing Master amounted to £21,115 15s. 11d. The amounts which the Board claimed to set off in respect of the appeals came to £2873 6s. 4d. They recommended that payment should be made of the sum due from the Board. The Committee also reported at some length on a proposed organization of the Chief Engineer's Department, on which they had received a memorandum from the General Purposes Committee, accompanied by a copy of one from the Works and Stores Committee. After giving details of the changes to be made (as fully set forth in the Works Committee's report), the Committee reported that the financial effect would be an immediate saving of approximately £1500 per annum, which would gradually increase as the compensations fell in. They submitted the result to the Board, but did not express any opinion on the merits of the scheme.

The Law and Parliamentary Committee reported that they had had under consideration a report by the Clerk (Mr. A. B. Pilling) in reference to the promotion of a Bill by the Board. The Committee pointed out that under section 13 of the Metropolis Water Act, 1902, the Board are required, within three years after the appointed day, to introduce into Parliament a Bill providing for uniform scales of charges applicable throughout the limits of supply, and that the Bill would therefore have to be deposited either next December or a year later. If, however, it were deposited in 1906, it would be passing through Parliament in 1907, in which year (on the 1st of June) the present Board would go out of office. As this might give rise to a serious position, they recommended that the proposed Bill be deposited next December.

The Special Arbitration Committee reported the result of the taxation of the New River Company's bill of costs. The amount originally charged was £36,863 17s.; and it was reduced by £16,263 2s. 1d.—leaving the £21,115 15s. 11d. mentioned by the Finance Committee in their report. Certain payments due from the Company's Solicitors in respect of the Board's costs in the Court of Appeal and the House of Lords might, the Committee said, be set off against this amount, which would result in a further reduction of upwards of £2000. The following are the totals of the taxed costs of the eight Companies: New River, £21,115 15s. 11d.; East London, £13,402 5s. 3d.; Chelsea, £10,748 6s. 2d.; Southwark and Vauxhall, £9629 4s. 1d.; West Middlesex, £9541 14s. 6d.; Lambeth, £9319 11s. 10d.; Grand Junction, £8793 3s.; Kent, £6270 18s.—total, £88,820 18s. 9d. The taxed costs in the arbitrations on the subject of the compensation to be paid to the Directors amounted to £2274. The Committee recommended that the estimate of £23,390 to be submitted by the Finance Committee in respect of the above-named sums of £21,115 15s. 11d. and £2274 be

CARBURETTED WATER-GAS APPARATUS

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The above Company have erected since 1893, or are now erecting, their Universal Type of Carburetted Water-Gas Plant at the following Gas-Works:—

	Cub. Ft. Daily.		Cub. Ft. Daily.		Cub. Ft. Daily.
BLACKBURN	1,250,000	ST. CATHERINES (Remodelled)	250,000	TONBRIDGE	300,000
WINDSOR ST. WORKS, BIRMINGHAM	2,000,000	KINGSTON, PA.	125,000	STRETFORD	500,000
SALTLEY WORKS, BIRMINGHAM	2,000,000	PETERBOROUGH, ONT.	250,000	OLDBURY	300,000
COLCHESTER	300,000	WILKESBARRE, PA.	750,000	TODMORDEN	500,000
BIRKENHEAD	2,250,000	ST. CATHERINES (2nd Cont.)	250,000	SALTLEY, BIRMINGHAM (Third Contract)	2,000,000
SWINDON (New Swindon Gas Co.)	120,000	BUFFALO, N.Y.	2,000,000	YORK (Second Contract)	750,000
SALTLEY, BIRMINGHAM (Second Contract)	2,000,000	WINNIPEG, MAN.	500,000	ROCHESTER (Second Contract)	500,000
WINDSOR ST., BIRMINGHAM (Second Contract)	2,000,000	COLCHESTER (Second Contract)	300,000	NEWPORT (MON.)	250,000
HALIFAX	1,000,000	YORK	750,000	TOKIO, JAPAN	1,000,000
TORONTO	250,000	ROCHESTER	500,000	PERNAMBUCO (Brazil)	125,000
OTTAWA	250,000	KINGSTON, ONT.	300,000	MALTON	150,000
LINDSAY (Remodelled)	125,000	CRYSTAL PALACE DISTRICT	2,000,000	DULUTH, MINN. (2nd Cont.)	300,000
MONTREAL	500,000	DULUTH, MINN.	300,000	BROCKVILLE (ONT.)	250,000
TORONTO (Second Contract Remodelled)	2,000,000	CATERHAM	150,000	SMETHWICK	500,000
BELLEVILLE	250,000	LEICESTER	2,000,000	GRAVESEND	300,000
OTTAWA (Second Contract)	250,000	ENSCHEDE (HOLLAND)	150,000	NEWPORT MON. (Second Contract)	250,000
BRANTFORD (Remodelled)	200,000	BUENOS AYRES (RIVER PLATE CO.)	700,000	TORONTO (Third Contract)	750,000
		BURNLEY	1,500,000	TORONTO (Fourth Contract)	1,000,000
		KINGSTON-ON-THAMES	1,750,000	MONTREAL, ONT. (2nd Cont.)	1,800,000
		ACCRINGTON	500,000	HAMILTON, ONT.	400,000

LEEDS, 1,800,000 C. Ft. LEICESTER (2nd Cont.), 1,000,000 C. Ft. NEWCASTLE-ON-TYNE, 1,800,000 C. Ft.

AND IN ADDITION, 7,500,000 CUBIC FEET DAILY; also Coal-Gas Plants at NELSON, B.C., CHATHAM, BERLIN, NAPANEE, OWEN SOUND, CALGARY, and WINNIPEG.

approved, and that an expenditure of this amount for the purposes mentioned be authorized.

The Works and Stores Committee presented a long report on the organization of the Engineering Department. In their introductory remarks they explained that they had had the question under consideration for some time, and had had before them a report from a Sub-Committee specially appointed to make an exhaustive inquiry into the whole subject. As the result, they submitted a scheme of organization based on the principles they thought would best serve the Board's interests. They then proceeded to deal with the division of the area of supply into five districts—viz., the New River (including Tottenham and Enfield), the eastern, the southern (comprising the Southwark and Vauxhall and Lambeth districts), the western (Chelsea, Grand Junction, and West Middlesex), and the Kent. This would ensure a more even distribution of the 1,021,854 supplies in the entire area, as shown by the following figures: New River, 203,824; eastern, 231,154; southern, 265,495; western, 209,712; and Kent, 111,669. The Committee then dealt with proposals to appoint a Deputy Chief Engineer, District Engineers, Chief Assistant Engineer, and the principal officers, and defined the work to be done by the Chief Engineer's department and by the District Engineers. The names, positions, ages, and salaries of the existing officers were set out in tabular form; and the Committee proceeded to consider how these gentlemen's services could be utilized most advantageously, and concluded with a long series of recommendations. They advised that the Board's area, for the purposes of engineering administration, should be divided into five districts, as indicated above; that the principal officers of the Chief Engineer's central department should consist of the chief, a deputy, and an assistant; and that the staff of the Chief Engineer in each district should comprise a District Engineer, assistants, draughtsmen and clerks, superintendents, and foremen. They recommended that Mr. J. W. Restler, the Engineer of the Southwark and Vauxhall district, should be appointed Deputy Chief Engineer to the Board, at such a salary as would, when added to the amount of the compensation to be awarded to him, afford him a net remuneration equivalent to that to which he is at present entitled. Among other appointments recommended were the following: Mr. E. Collins, the Distributing Engineer of the New River Company, to be Engineer of that district; Mr. W. Blackburn, Deputy Engineer of the East London district, to be Engineer for that district; and Mr. H. F. Rutter, Engineer of the West Middlesex district, to be Engineer for that portion of the Board's area. The Committee proposed to make Mr. T. F. Parkes and Mr. J. Goodman the Assistant Engineers in the southern and western districts, and to abolish the offices held by Mr. J. Francis, the Supply Engineer, and Mr. E. L. Morris, the Filtering and Pumping Engineer, of the New River Company, and by Mr. A. A. Gill, the Engineer of the Chelsea district. The recommendations of the Committee were all adopted, with a reduction in the commencing salary proposed to be paid to Mr. Blackburn.

The same Committee reported that they had received a letter from the London County Council with reference to the supply of water at a fire in Church Road, Battersea, on the 20th of February. They had also received a full report from the Chief Engineer on the subject, in which he asserted that the Clerk of the County Council had not accurately expressed the state of affairs. He stated that a good supply of water was at first obtained from the hydrants by two steam-fire engines; but when other engines arrived and drew more water from the mains, the supply suddenly ceased. If he had stated that the supply was diverted to another point, it would have been correct; but for it to cease altogether to the whole of the engines, as one was given to understand from the reading of his letter, was quite an impossibility. He added that the capacity of the 5-inch main supplying the road was ample, and more than ample, for all the ordinary purposes of supply for domestic and trade uses; and it also gave sufficient water to enable eight engines to work from it. The Committee explained that Mr. Restler, the Engineer of the Southwark and Vauxhall district, who was present at the fire, advised the officers of the brigade that additional water could have been obtained from the 7-inch main in Bridge Road West. The Committee reported that they had given instructions for a reply to be sent to the County Council explaining the facts.

A return of the details of supply during the month of February was submitted. It showed that the total average daily supply was 205,273,000 gallons, and that the total number of houses supplied was 1,021,854, while the total estimated population was 6,730,740. The mean supply per head per day was 30·5 gallons, against 30·9 gallons in February, 1904. The water in store in impounding reservoirs at the end of the month was 6970 million gallons. There were 1390 new supplies laid on, and 8838 yards of new mains were laid. There were 322 fires in the entire area of supply; the largest number (112) being in the Southwark and Vauxhall district, while 62 and 57 occurred in the New River and West Middlesex districts.

In view of the concentration of the Board's business, it has been necessary to take on lease additional rooms at Savoy Court, at a rent of £1000 per annum.

HORSFORTH WATER SUPPLY.

Local Government Board Inquiry.

Last Wednesday, a Local Government Board inquiry was conducted by Major C. E. Norton, R.E., respecting an application for a Provisional Order to enable the Horsforth Urban District Council to construct additional water-works; to borrow money for defraying the cost of opposing a Bill promoted by the Horsforth Water Company, and the costs incidental to the transfer of the water undertaking from them to the Council; and to make bye-laws for preventing the pollution of the water. It was stated that money had been borrowed amounting to £41,969 for the purchase of the water-works, and £1906 for the cost of the promotion of the Bill. The total amount was £45,280, and the

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MIDLAND IRON WORKS: Donnington, near Newport, Salop.

LONDON OFFICE: 110, Cannon Street, E.C.

NEW EDITION of VALVE CATALOGUE SENT on APPLICATION.

outstanding debt was £41,517. The rates were 7s. 6d. in the pound, of which 5s. was the general district rate, and 2s. 6d. the poor rate. A rate of 1d. in the pound produced about £100.

The circumstances which had rendered the inquiry necessary were explained by Mr. J. A. Compston, who appeared on behalf of the Council, and who stated that the Horsforth Water Company obtained powers to supply the district with water in 1865. A somewhat serious outbreak of enteric fever occurred in 1896, which was attributed to the water supply; and strong evidence was then found that excremental pollution of the water had passed into the storage reservoirs from the gathering-ground, and that from time to time unfiltered water had been allowed to go into the town supply. At that time the Directors of the Company had in contemplation extensions of their works; and in 1899 they promoted a Bill for power to take in new gathering-ground and construct a reservoir. The Bill was successfully opposed by the Council, who promoted one of their own to acquire the undertaking. This power was granted in 1899; and it was from that time that the difficulties had arisen. There had been frequent shortages of water in dry seasons previous to 1899, and this was the reason why unfiltered water was sent into the town. The works were handed over to the Council in October, 1900. On the recommendation of Mr. Silcock, of Leeds, a borehole was sunk in December, 1901, at a cost of about £800, in order to obtain an additional supply. The Council were face to face with a dry season in 1903, and the possibility of a water famine. Mr. Silcock's recommendation included a pumping-station and a rising main; and in December, 1903, plans and estimates were sent to the Local Government Board with a request that they would sanction a loan of £4500. The Board said they had no power to sanction the expenditure, and legislation was therefore the only method of dealing with it. As the season advanced, a water famine was imminent unless steps were taken to avoid it, and the Council took the risk of connecting the borehole with their source of distribution; and they hoped the Local Government Board would now recognize the necessity of that action.

Evidence was then called. Mr. J. C. Maisey, the Accountant to the Council, said the water revenue account showed losses as follows: To March 31, 1902, £868 17s. 8d.; March, 1903, £1033 6s. 4d.; and March, 1904, £711 9s. 6d. Mr. Silcock explained the works which had been undertaken, and the arrangements he considered necessary for ensuring an effective water supply.

There was no opposition to the application; and after hearing the evidence, the Inspector visited the district.

Winsford Gas-Works.—It is satisfactory to report that since the Urban District Council took over the local gas-works three years ago, there has been an addition of 234 consumers. The make of gas has been increased by 19·19 per cent., and the price reduced by 7d. per 1000 cubic feet for lighting and cooking, and 1s. 1d. for engines. A profit of £300 was reported on the past year's working.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

Although the Western District of the Scottish Junior Gas Association have finished their session, the Eastern District have still a good way to go. They held a quarterly meeting in Edinburgh this afternoon; and they have another meeting yet on their syllabus, which does not fall to be held till July 1.

The material laid before to-night's meeting was again of a high order, as well as of much practical value. Mr. Webster's paper upon hydraulic power in gas-works was just such a production as any junior engineer should be proud to lay his hands upon. He gave a full and exceedingly clear description of the most modern hydraulic power plant in use; but, better than description, he freely gave his reasons for preferring one form of machine to another. Going further, he carried his reasons and arguments into the domain of the future, and laid before his hearers one or two most ingenious suggestions as to the possible application of hydraulics in reducing costs and labour.

Mr. Brown's paper on domestic lighting was less striking, because of the familiarity which everyone has with his subject, and the consequent difficulty of saying anything new upon it. Its merit lay in its being a record of experiences, leading to conclusions which are valuable. As he explained, his figures were arrived at in the course of a quest for reliable information which would enable him to meet with argument those who might have interests in other forms of lighting than by gas. His conclusions, it is to be noted, do not carry us into the higher regions of lighting. High-pressure gas lighting is not taken into account. The field explored by Mr. Brown was that of ordinary domestic lighting; and he easily proved the superiority of gas.

The better discussion was upon Mr. Brown's paper, which seemed to be more understood, or, at all events, to come nearer to the members than did Mr. Webster's. At the same time, acknowledgment must be made of the exceedingly appropriate and weighty remarks which were made by Mr. Alex. Wilson, of Glasgow, upon Mr. Webster's paper, and not upon it only, but upon both communications. The District are greatly indebted to Mr. Wilson for his presence, and for the interest he takes in them generally. He is, it is to be remembered, an honorary member of the Eastern District, as he is of the Western.

Edinburgh gas, I truly wish I could let it alone, because there has been so much said about it of late; but it seems to be a perpetual subject of discussion—and dissension. This week it has come up in the form of letters to the Editor of the "Scotsman." These I would have felt myself justified in passing over, but for the circumstance that, for once, the correspondents have put their names to their communications. Yesterday, Mr. Robert Maule, a leading draper in the city, wrote that he was amazed to read that some of the Gas Commissioners were proposing to reduce the quality of the gas, and went on to say that, with the dismal inferiority of the existing standard of illuminating power

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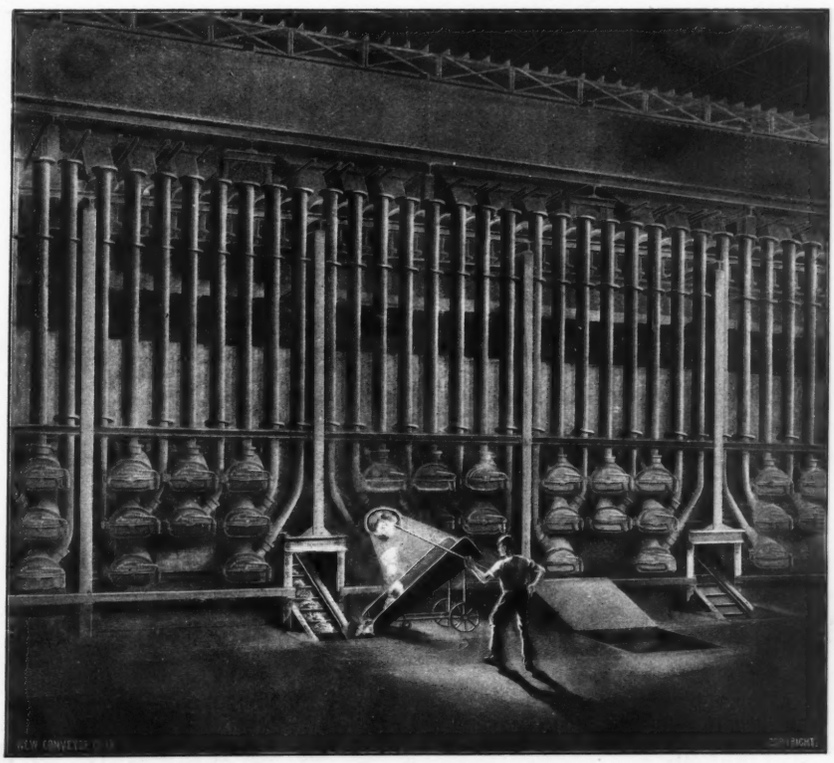

Producer Fed with Hot Coke.

PATENT "DWARF" INCLINED RETORT-BENCH.

NEW CONVEYOR CO., LTD., SMETHWICK.

brought home to him every night in his own house, he was wondering how any reduction could be effected without quenching the feeble glimmer altogether; and that with this proposal before the Council, it would almost seem that the Commissioners were bent on deliberately making the gas unsuitable for illumination. Dealing with the theory of deterioration *en route*, he maintained that the duty of the Commissioners was obviously to supply a higher standard to begin with, so that consumers at a distance, in spite of deterioration, might have a gas of the quality to which they were entitled—that was good enough to give good reading light from the ordinary flat-flame burner, without the adventitious aid of incandescent attachments. To-day there are three letters, all signed. Mr. James Shaw, writing from St. Bernard's Crescent, which is on the side of the city next to Granton, asserts that in his house, with a 3-light gaselier and large-sized burners, it is difficult to be able to read. Mr. James T. R. Wilson, the Gas Commissioner who is responsible for the proposal to reduce the illuminating power, writes in reply to Mr. Maule and to letters which he has received privately on the subject. He points out that in cold weather there is a deposition of hydrocarbons, which reduces the illuminating quality of the gas; it may be to the amount of five candles. Tests taken several times daily by the Corporation officials, and the independent tests of the City Analyst, show that the resolution of the Commissioners to supply gas approximating 25-candle power is faithfully carried out. He believes it would be possible to manufacture a gas of about 20-candle power which would be permanent, and which would reach the consumers undeteriorated, and give them the same results as at present, at the same time effecting economy in manufacture. Then Mr. W Anderson, a vendor of incandescent gas lighting appliances, writes that a reduction of only a few candles would affect the heating quality of the gas imperceptibly, while practically any quality of gas is suitable for incandescent lighting; and that an installation of incandescent burners could not be considered expensive, as in a year they should pay for their cost in a reduced gas bill. There the matter rests for the present.

An exhibition of the gas appliances by Messrs. Fletcher, Russell, and Co., Limited, the Richmond Gas Stove and Meter Company, Limited, and Messrs. R. & A. Main, Limited, was opened in Broughty Ferry last Monday. The lighting was by the high-pressure system of the James Keith and Blackman Company, Limited; and there were incandescent gas-fittings of artistic design, by Messrs. Falk, Stadelmann, and Co., Limited, and Messrs. J. & W. B. Smith. In opening the exhibition, Mr. J. P. Chrystal, the Convener of the Gas Committee, said he feared there was no immediate prospect of the gas being reduced in price, but in a year or two this would doubtless be possible.

Subsequently Mr. G. Keillor, the Gas Manager, delivered a lecture on "Gas and Its Application to Domestic Purposes." The lecture was illustrated by some limelight views. He began by stating that at the end of January, the department were supplying 2610 consumers with gas; and of this number only 400 used gas cooking-stoves. Speaking of incandescent gas lighting, Mr. Keillor said that with inverted burners a light of from 18-candle power upwards for every cubic foot of gas used per hour could be depended upon. For ordinary purposes, a burner consuming from $3\frac{1}{3}$ to 4 cubic feet of gas per hour was the best. From such a burner a light of 65 to 75 candles could always be obtained; and with gas at 3s. 6d. per 1000 cubic feet, the cost need never be more than 1d. for five hours' burning. The same quantity of gas burned in an old flat-flame burner would only give from 14 to 16 candle power. Gas of from 18 to 20 candles was much too good to be wasted upon incandescent lighting. Equally good results could be obtained with 12-candle gas; and as 14-candle gas was what their Act of Parliament said they might supply, he was of opinion that they should come down to a 14-candle standard as early as possible. Mr. Keillor showed that it was possible, by means of a pneumatic arrangement, to switch up and down the incandescent gas-lights with just the same facility as electric light. The lecture was listened to attentively by a large audience, who frequently applauded Mr. Keillor's lucid statements.

At a meeting on Monday of a Special Committee who are in charge of the Dundee Water Provisional Order, Treasurer Ritchie reported that he and the Town Clerk, when in London the previous week, had an interview with the Under-Secretary for Scotland on the subject of the sinking-fund clauses in the Draft Order. The Scotch Office declined to pass the measure as it was presented, and insisted that additional sinking-fund provision should be made in respect of their water annuities. The additional sinking-fund provision will amount to $\frac{1}{4}$ per cent. to be set aside annually, commencing in 1910, and $\frac{1}{2}$ per cent. after 1915. This is equal to £1000 and £2000 respectively. The Order will now pass as an unopposed measure.

The Parliamentary Commission which I mentioned last week as sitting in Edinburgh, had also before them an application by the burgh of Grangemouth for an extension of the burgh boundaries, and an alteration upon an Order which they at present possess for the supply of water to the burgh. As regarded the water, what was asked was to be allowed to substitute another site for one already authorized for the construction of a reservoir. There was no opposition upon this point. Upon the extension of boundaries, the County Council of Stirling appeared in opposition. They said a similar application was rejected last year, and that there had been no change of circumstances in the burgh since then; but there had been on their part. The County Council had, under an Order obtained in 1900, constructed water-works for the supply of the eastern district of the county, and since last year they had laid their pipes into the area, in which is situated a large new dock, and other works which are under construction. The Town Council proposed to take into the burgh an area extending to 851 acres, in which are the new dock works. To take this away, the County Council said, would greatly cripple them in their administration. The Commissioners, after hearing evidence for three days, intimated that they passed the extension clauses, subject to the condition that the Town Council should take the water supply for the extended area from the County Council. They invited the parties to come to an arrangement with regard to the quantity of water which the County Council could undertake to supply, and the burgh advantageously to use.

SPRING!

Trade increased

by Hiring

RICHMOND'S COOKERS.

ADVERTISEMENT OF THE RICHMOND GAS STOVE & METER CO., LTD. LONDON: 182, QUEEN VICTORIA STREET, E.C. WORKS & OFFICES: WARRINGTON & STRATFORD.

CURRENT SALES OF GAS PRODUCTS.

Week ending April 1.

The position in the actual London market is that makers would not accept less than from 33s. 6d. to 34s. per ton for pitch for delivery this side of June; and from 34s. to 35s. for October to March shipment.

A fair quantity of ordinary creosote is reported as having been recently sold at 1⅛d. per gallon; but otherwise the article is very firm, at from 1⅜d. to 1⅝d.

The chief makers of anthracene are being compelled to discontinue its manufacture, as buyers' suggestions of price are at present below the cost of production. The small stocks held in London are quoted at from 2½d. to 2¾d. per unit for 40-45 per cent. "A" quality.

As to sulphate of ammonia, for prompt or April delivery, £12 17s. 6d. is being asked, on Beckton terms; but £12 15s. is the highest price obtainable.

LIVERPOOL, *April* 1.

Sulphate of Ammonia.

Throughout the week there has been good inquiry, and a fair amount of business has been done; but the large buyers are still endeavouring to get in at a further decline in values, and they have been encouraged by speculative offering for near months at a discount on prompt prices. Consequently, for the most part, urgent orders only have been placed, for immediate shipment. The closing quotations are £12 11s. 3d. per ton f.o.b. Hull, £12 13s. 9d. per ton f.o.b. Liverpool, and £12 15s. per ton f.o.b. Leith. No important first-hand business has transpired. The large makers, however, show further disposition to meet buyers, but to very little purpose, owing to speculative offering at still lower prices.

LONDON, *April* 1.

Tar Products.

There is very little fresh business to report, although there has certainly been rather more inquiry. Benzol is very dull, and sales are reported at 9d. per gallon f.o.b. London; while 8d. was accepted in the North of England for prompt delivery. In 50-90 per cent., there is still some inquiry for delivery over the next six months; but the prices offered by consumers will not tempt distillers to sell for forward delivery. There appears to be an improved inquiry for toluol; but just at present there is very little offering, either in London or the Provinces. In solvent, there has been a little business doing in London for home consumption; while the demand for naphtha having a heavy specific gravity and a high flashing point has been fairly good, and prices for this quality are well maintained. There is nothing doing in anthracene, as makers will not entertain business for forward delivery at the prices offered by consumers. In carbolic acid, there is still a certain quantity of business doing for export, although English consumers will not pay the prices asked by manufacturers. Several parcels have been sold for shipment at outports at 1s. 9d.; while it is reported that 1s. 9½d. was realized by one of the London distillers for early delivery. In crystals, the inquiry still keeps fairly good; but what little business has been done has evidently been at very low prices, and under those quoted by English manufacturers. The London market in creosote remains in about the same position; and as most of the largest producers are well sold, there does not seem much chance of an alteration just at present. So far as Yorkshire is concerned, there have been one or two small sales made during the past week; but there is still a considerable quantity offering in the Manchester district, where the value cannot be taken as more than 1⅛d. for prompt delivery. It is reported that there is still a very good inquiry for forward delivery for shipment to America; but business has not at present resulted. The market in pitch is decidedly easier; but there has been very little doing. So far as London is concerned, the principal producers still maintain their quotation, and ask 33s. to 34s.; but there are second-hand sellers at very much under this, and business has actually been done for prompt by dealers at very low prices. In Yorkshire, there has been a little business doing for April-June shipment; but the demand from Belgium has certainly not improved as was expected, as consumers do not seem at all anxious to purchase for early delivery, and appear to think that prices will be easier for the winter months, and that therefore there is no necessity for them to come into the market just at present. There is still considerable weakness in the Liverpool and Manchester district; but very little, if any, actual business has been done. With regard to South Wales, one or two small contracts are reported for July-December delivery, but at low prices; while as regards prompt, all the consumers appear to be well supplied.

The average values during the week were: Tar, 18s. to 22s. Pitch, London, 31s. 6d. to 31s. 9d.; east coast, 30s.; west coast, 28s. 6d. Benzol, 90 per cent., 9d.; 50-90 per cent., 7½d. to 8d. Toluol, 8d. Crude naphtha, 3d.; solvent naphtha, 8d. to 8½d.; heavy naphtha, 9½d. to 10d. Creosote, London, 1⅝d. to 1 11/16d.; North, 1¼d. Heavy oils, 2d. to 2 1/16d. Carbolic acid, 60 per cent., 1s. 9d. to 1s. 9½d. Refined naphthalene, £4 to £8; salts, 15s. to 17s. Anthracene, "A" quality, 1½d. to 1⅝d.; "B" quality, unsaleable.

Sulphate of Ammonia.

The market has been decidedly quiet, and closes with rather an easier tone. The Gaslight and Coke Company now quote £12 15s. Beckton for April shipment; and although they do not find buyers at this price, they are not inclined to reduce their quotation. The South Metropolitan Company are quoting £13, but are not finding any buyers at this figure. In Leith, makers ask £12 15s.; but it is reported that dealers have accepted under this for prompt shipment. There has been very little doing in Hull. One or two small parcels were, however, sold for early shipment at £12 12s. 6d. at the commencement of the week; while at the close £12 10s. was accepted more than once.

THE

MAXIM PATENT CARBURETTOR

FOR ENRICHING GAS IN BULK.

PREVENTS NAPHTHALENE DEPOSITS.

OVER **120** MAXIM PATENT CARBURETTORS HAVE NOW BEEN FIXED.

Among the Companies and Towns supplied are The Gaslight and Coke Company, The South Metropolitan Gas Company, Birmingham, Leeds, Rochdale, Bristol, Sheffield, Oldham, Dundee, Perth, Dunfermline, and many other Works, both large and small, where they have been working in some instances for the past **Ten Years.**

MORE GAS & SALEABLE COKE PER TON of COAL CARBONIZED is PRODUCED; SAVING CAPITAL, LABOUR, FUEL, WEAR & TEAR, &c.

THE ENRICHMENT IS INSTANTANEOUS AND PERMANENT.

The Carburettor is inexpensive, easily fixed, and entirely supersedes the use of Cannel.

Dealers in Benzol, Carburine, and all other Naphthas and Oils suitable for the Enrichment or Production of Gas.

For Prices and full Particulars, apply to

THE GAS LIGHTING IMPROVEMENT COMPANY, LIMITED,

18, DEVONSHIRE STREET, BISHOPSGATE, LONDON, E.C.

COAL TRADE REPORTS.

Lancashire Coal Trade.

The pits continue fully employed. With the exception of house coal, for which there is only an ordinary demand, other qualities find a ready sale, especially for steam and forge purposes. Prices continue without quotable change. The widest variation is met with in the commoner sorts, but not more than is usual; and for the most part this is not so pronounced as when trade was less prosperous in the county than it is at present. Coal for shipping is steady. Coke also meets with a good demand.

Northern Coal Trade.

There is a rather fuller demand for coals, owing to the opening of the Baltic shipping season. In the steam coal trade, there is a better inquiry, with prices rather firmer at 9s. per ton f.o.b. Second-class steams are 8s. to 8s. 3d. per ton, and steam smalls about 4s. 6d. to 5s. With the more regular working of the collieries, the production of small coals is now more adequate; and the prices are easier. In the gas coal trade, the demand for the contracts is now less; but there is some increase of the exports, and prices are steady at 7s. 10d. to 8s. 3d. per ton f.o.b. Contracts are now being rapidly settled for several of the largest buyers, local and southern; and while in some cases a very slight reduction has been made in the price, there is generally the retention of the rate that has been paid under the contracts that are now running out. As near as can be stated, the f.o.b. price may be put as varying with the quality from about 7s. 6d. to 8s. per ton; and these quotations are also about the values that have been paid under the large local contracts that have been arranged. As to the Rotterdam contracts, only about one-third has come to this district, the rest being allotted to Germany. Coke is fairly steady in price; and gas coke has not changed much—the diminished output causing some of the stocks to be reduced a little. The prices are without variation.

Scotch Coal Trade.

Trade remains quiet. Orders are scarce; but it is expected that the opening of the Baltic trade for the season will somewhat improve matters in this respect. Reductions in wages are attempted to be put in force in some of the Lanarkshire collieries. This is being resented by the miners, and strikes are spoken of; but it is felt that any action the men might take at present would only have the effect of enabling accumulated stocks to be cleared off. The prices quoted are: Main 7s. 3d. to 7s. 6d. per ton f.o.b. Glasgow, ell 7s. 9d. to 8s. 9d., and splint 8s. 6d. to 8s. 9d. The shipments for the week amounted to 194,018 tons—an increase of 4842 tons upon the previous week, but a decrease of 24,554 tons upon the corresponding week of last year. For the year to date, the total shipments have been 2,506,059 tons—an increase of 299,014 tons upon the same period of 1904.

TRADE NOTES.

Purifiers with Jager Grids for the New Poole Gas-Works.

Messrs. Ashmore, Benson, Pease, and Co., Limited, have received an order for four purifiers, 30 feet square and 6 feet deep, with lifting gear, valves and connections, roof, &c., for the new Poole works of the Bournemouth Gas and Water Company. We understand that it is specified that these purifiers are to be fitted with the Jager grids of Messrs. S. Cutler and Sons.

Clapham's Dry-Lute Purifiers.

The Gas and Lighting Committee of the Ashton-in-Makerfield Urban District Council have accepted the tender of Messrs. Clapham Bros., Limited, for two purifiers, each 14 feet square and 5 feet deep, with connections, valves, and lifting apparatus, also for an overhead tar and liquor tank, to the designs of the Engineer and Manager (Mr. Herbert Niven). The purifiers are of the dry-lute type, and will be complete with Clapham's patent "Eclipse" rubber joint.

Imperial Continental Gas Association.—The Directors of the Association will, at the next half-yearly meeting, recommend a dividend of 5 per cent. for the six months ended Dec. 31, free of tax.

The Gas Supply of the City of London.—In his annual report on the gas supplied to the City of London, Professor Lewes, the Chief Gas Examiner to the Corporation, states that the standard illuminating power (16 candles) had been maintained and generally exceeded at all the testing places, but on three occasions it was deficient. The gas-meters tested last year numbered 65,247, and the fees received amounted to £2076. Of these meters, 1514 were rejected. The number of meters tested in disputes between the consumers and the Gas Companies was 6744. Of these 2808 were found correct and re-stamped. Of the remainder, 8934 faults were detected and remedied.

Accident at the Walshaw Dean Water-Works.—An accident involving the loss of two lives has occurred at the Walshaw Dean Water-Works, which are under construction for the Corporation of Halifax. No one except a signalman was near the spot at the time of the occurrence, which took place in the early hours of last Tuesday morning; but on his raising an alarm other men hastened up, and found that an engine and crane had fallen over and killed the two men who were in charge. The engine and crane, which were used for lifting *débris* from a trench, were fixed on a gantry, along which the engine could travel a few yards; but the driver sending it in the wrong direction, it ran over the stop-block, and fell with the crane a distance of 22 feet on to the side of the trench.

SEASON 1905.

TAKING LINES WITH GAS COMPANIES.

The "MAIN"

Slot Cookers

15 DIFFERENT SIZES.

Specially Designed for Hiring.

R. & A. MAIN, LIMITED,

LONDON AND GLASGOW,

ALSO AT

FALKIRK, BIRMINGHAM, BRISTOL,
MANCHESTER, MELBOURNE, AND SYDNEY.

Proposed Reduction in Price at Manchester.—At their meeting to-morrow, the Manchester City Council will consider a recommendation of the Gas Committee to reduce the price of gas from June 24 by 1d. per 1000 cubic feet—namely, from 2s. 4d. to 2s. 3d. in the city, and from 2s. 7d. to 2s. 6d. outside.

Extension of the Basford (Nottingham) Gas-Works.—The Gas Committee of the Nottingham City Council report that they find it is necessary to complete the extension commenced in 1901 at the Basford Gas-Works, owing to the rapid increase in the rate of gas consumption during the past winter, which reached the large figure of 10,600,000 cubic feet per diem; this being considerably higher than the daily consumption of any previous year—an increase, in fact, of more than 7 per cent. on the highest daily output for the previous winter. The further extension will comprise a new bench of retorts capable of producing about a million cubic feet of gas daily. The cost, including retorts, foundations, coke conveyors and hoppers, new boilers, &c., is estimated at about £18,000.

Cardiff Water-Works Department.—In connection with an inquiry which is being made by the Cardiff Corporation into the working of all its departments, facts and figures have been supplied by the Water Engineer (Mr. C. H. Priestley, M.Inst.C.E.), regarding the expenditure in his department. This showed that from 1898 to the present time £72,308 had been spent on extensions. The Engineer's commission on these works amounted to £4468, from which was deducted £2230, the cost of extra staff in the office who had been engaged on the works (including all salaries in excess of those paid in 1898), and also on plans and estimates for reports, &c. A table of yearly revenue and working expenses showed that in 1890 the gross revenue was £32,516, and the working expenses 17·88 per cent. In 1904, the revenue was £63,548, and the working expenses 16·85 per cent. The average for the past seven years was 16·46 per cent., and for the previous seven years 17·76 per cent.; the former including all assistants' time on new works.

Yorktown and Blackwater Gas Company.—At the meeting of this Company last Thursday, the Directors reported that during the past year further improvements had been made at the works, and new and larger mains laid in a considerable portion of the district. The result of the year's working was a balance of £1946 for division; and the Directors recommended the payment of dividends at the rates of 10 and 7 per cent. In moving the adoption of the report, the Chairman (Mr. A. H. Claypole) said the make of gas had reached 42,523,200 cubic feet, which included a whole year's consumption at the colleges, instead of a half-year's as in the preceding balance-sheet. There was an increase in the district itself of 2,516,700 cubic feet, or about 10 per cent. On the expenditure side of the revenue account, there was an increase of £1226 for coal and cartage, and of £127 for wages. These were both natural increases, as the result of additional business. The report was adopted, and the dividends recommended were declared.

River Plate Gas Company, Limited.—The report for the year 1904 shows a profit of £113,237, to which have to be added receipts from other sources and the amount brought forward; making a total of £130,902. After payment of fixed charges, making the usual allowance for bad and doubtful debts, and providing for the maintenance of works, mains, &c., there remains to be dealt with the sum of £105,658. The Directors recommend the placing of £25,000 to the reserve fund (raising it to £120,000), and the payment of a final dividend for the year at the rate of 8s. per share; making 7 per cent. for the year, free of tax, and leaving a balance of £21,083 to be carried forward. The reserve fund is invested in the business; but the Directors think the time has arrived when it should be kept separate, and be invested, as far as possible, in first-class realizable securities. In order to provide the funds for this purpose, and for further extensions of mains and services, they have resolved to offer to the shareholders, at par, 14,893 shares of £10 each, raising the capital to £1,000,000.

Leeds Water-Works.—At the annual meeting of the National Registration of Plumbers, held in the Philosophical Hall, Leeds, last Wednesday, Mr. J. H. Armitage, the Chairman of the Water Committee, gave a lecture on "The Leeds Water-Works, Old and New," illustrated by lantern views. He said the first mention he could find of the old water-works was in 1694, when a Company was formed for pumping water out of the River Aire into a small reservoir near the spot where now stands St. John's Church in Briggate. This supply the Leeds people had to depend upon for some years. Eventually, in 1852, the Corporation acquired the rights of the Company for £225,000. Coming to the present works, the lecturer's description and pictures of the new scheme in the Washburn Valley proved of intense interest. Some idea of the magnitude of the work may be gathered from the fact that the new Colsterdale reservoir will hold 18 million gallons of water. It will take ten years to complete. He warned his audience that, owing to the nature of the soil in the bed of the reservoir, it might be that instead of the estimated £300,000 which the scheme was to cost, they would have to face an expenditure of about £500,000.

Deficiency of Water at Fires.—In the course of the proceedings at the meeting of the Metropolitan Water Board last Friday, reported elsewhere, reference was made to a failure of water at a fire. In connection therewith, it may be mentioned that deficient water pressure in a street main at Lexington (Ky.), on the occasion of a fire, resulted in a suit against the Lexington Hydraulic and Manufacturing Company, who own the water-works. The Company, were, however, successful in the Kentucky Court of Appeals. Referring to the case, "Engineering Record" says the general law of the State in this matter is as follows: "For breach of a contract between a water company and a city, in which the former stipulates to furnish a certain pressure for fire hydrants, the company are liable to an individual property-owner for damages by fire from lack of the stipulated pressure. In this Lexington case, however, this general decision has been interpreted with due regard for natural as well as human laws. The contract requires the company to be prepared to throw six streams simultaneously from 1-inch nozzles on 2½-inch hose to a height of 80 to 100 feet. The Court rules that this does not call for six streams from one street main, but merely six streams from different parts of the system, when a pressure sufficient to throw six such streams from a 4-inch main would probably burst it, as well as most of the plumbing in the city."

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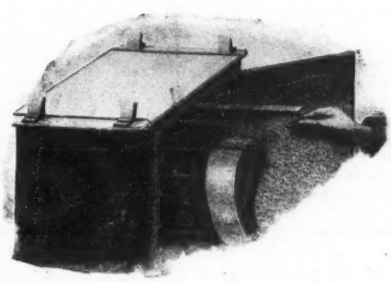
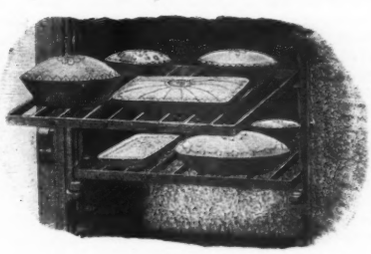
HINGED HOT-PLATE.



SLIDING MEAT-HOOK



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COTTAGE LANE, CITY ROAD, LONDON.

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Croydon Water Supply.—At the meeting of the Croydon County Council on Monday last week, it was decided to apply to the Local Government Board for authority to borrow a sum not exceeding £20,000 to carry out additional water-works, in accordance with a report made by the Borough Engineer and Mr. G. R. Strachan; and these gentlemen were instructed to inquire into and report upon the water question generally, with the view to an application being made to Parliament next session with respect thereto.

A Costly Act of Parliament.—Our readers may remember that a Water Board has lately been formed for the Oakengates and Dawley urban districts and parts of Wellington rural district, with the object of embarking on a water scheme for these districts, which are at present without water. The total cost of obtaining the Act as delivered was £5031 14s. This sum included £2888 for law costs, and £1065 for engineers' charges. The reductions made in taxing the costs bring down the total to £4232, which is said to be an extraordinary sum to pay for an Act of Parliament; and much indignation is felt in the district at the large expenditure.

Incandescent Gas for Church Lighting.—The "Nottingham Express" last Friday contained a remark to the effect that it had been decided to return to gas for lighting one of the churches in the city. This brought a letter next day from the Vicar of St. Paul's (the Rev. G. Bishop), who said: "Your remark justifies me in reporting that the use of incandescent gas instead of electric light for our choir has resulted in the electric light account for last Christmas being £2 15s. 4d., instead of about £7 the previous Christmas. Moreover, we get a better light; and the only murmur from the congregation that I have heard is that the whole church is not yet lighted with gas-mantles."

New Reservoir for Leeds.—At the meeting of the Water Committee of the Leeds Corporation last Thursday, the tender of Messrs. R. M'Alpine and Co., of Glasgow, was accepted for the construction of the Colsterdale reservoir for £297,000. The decision of the Corporation to have the work done by contract was, it may be remembered, come to in the face of much opposition from the Labour party. This reservoir is the first of the four to be constructed in the Ure Valley; the others being the Leighton, the Carlesmoor, and the Laverton. When full, it will hold nearly 2000 million gallons; and to retain the water it will be necessary to build an embankment across the valley 100 feet high, with a roadway on the top 30 feet broad. The base of the embankment at its widest part will be 600 feet.

Gas and Electricity Supply in Rome.—At the meeting of the Anglo-Romano Gas Company held in Rome early last month, the Directors reported an increase of about 33½ million cubic feet in the quantity of gas sold last year. The profits realized, however, were less than before, owing to the fall in the price of coke and the increase in the cost of manual labour. With regard to electricity, there was an increase in sales of 1,737,313 kilowatts, chiefly due to the power utilized for traction, which, as prices had been recently reduced, made it possible for omnibus companies to extend their lines. The Directors pointed out, however, that increase of consumption imposed continual sacrifices on the Company, who were compelled to supply further power to meet the demands of the public, which were very variable. The meeting approved of the proposal of the Board to fix the dividend at 73 lire (60s.) per share, of which 20 lire was paid in October.

Danger of Electric Light for Operating Rooms.—Referring to the well-known habit of the electric light to suddenly fail at inconvenient times, the "Lancet" says: "The danger which this indicates when surgical operations are being performed with the aid of this illuminant alone, is considerable. In large hospitals, it may be possible for the institution to make special arrangements. This, however, is not the case in private hospitals and nursing homes; nor can any private house be free from the possibility that, in the midst of an operation which may not of itself be of a critical character, an element of great danger may be introduced by sudden and unexpected darkness occurring." Our contemporary is none too soon in issuing this warning, for already two instances have been recorded in the "JOURNAL," in one of which the electric light went out immediately before an operation, and in the other directly after. Had the collapse occurred a little later in the one case and a little earlier in the other, the result might have been fatal to the patient.

Disposal of the Gas Profits at Lancaster.—The Lancaster Gas Committee resolved that £1000 should be placed at the disposal of the Finance Committee (in addition to the free lighting of the public lamps) out of their profits, and that the balance on the year's working (£1679) should be placed to the credit of the reserve fund. The Finance Committee, however, "asked for more;" and the Gas Committee reluctantly consented to increase the grant to £2500—leaving £179 to go to the reserve. At the meeting of the Town Council at which this was agreed to, Alderman Bowness said he did not agree with the course that it was proposed to adopt. It was bad finance, and could only end in disaster if pursued in future. It was not fair to the gas undertaking, which had been successful because it had been ably managed. It was well to have a good reserve, which acted as working capital; for otherwise they would have to borrow money for improvements, and pay interest upon it. Other members also expressed disapproval of this additional grant.

Mr. John H. Roby has been appointed by Messrs. Willey and Co., Limited, of London and Exeter, as their representative in the North of England.

The Economic Safety Gas Company (Western), Limited, has been registered with a capital of £20,000, in £1 shares, to adopt an agreement with the Economic Safety Gas Company, Limited, relating to a further licence under certain patents, and to carry on the business of manufacturers of, and dealers in, apparatus of all kinds for increasing the illuminating power of gas, spirits, oils, electricity, and other light-producing agents, gas engineers, workers and fitters, &c. There will be no initial public issue.

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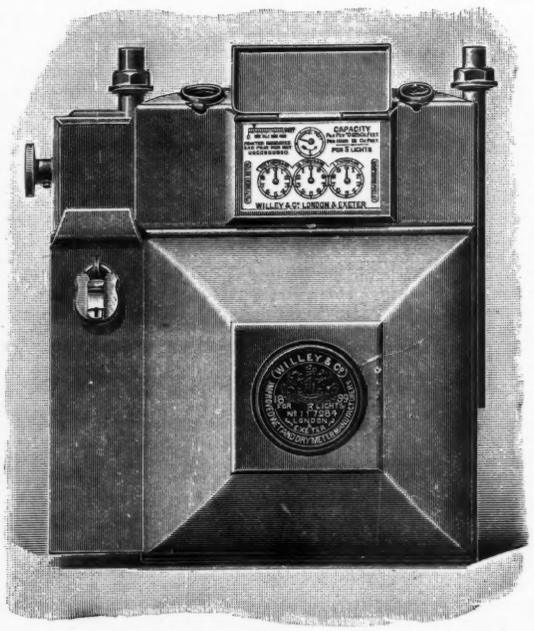
of advantage from the many found in our Slot Meters are:

1st.—They are Fraud Proof, and Cannot be tampered with through the Slot.

2nd.—The Slot is closed when the maximum number of Coins have been inserted.

3rd.—Our Price-Changing System is the Simplest, Quickest, and most Accurate yet devised.



ALL PARTS INTERCHANGEABLE.

Tens of Thousands in use, and adopted exclusively by many Gas Companies.

WILLEY & CO., LTD., LONDON & EXETER.

The Keighley Gas Committee report that there will be a surplus of £5780 in relief of the rates, after the cost of the Fire Brigade has been provided for.

Mr. E. J. Silcock, M.Inst.C.E., has been instructed by the Tadcaster Rural District Council to prepare a scheme of water supply for Cross Gates, with possible extensions to other townships.

The Glyncorrwg Urban District Council have applied to the Local Government Board for authority to raise a loan of £1000 for the extension of their gas-works. The matter was inquired into last Thursday by Major J. Stewart, R.E.; but there was no opposition.

The Portadown Gas Company, Limited, have placed an order with Messrs. Robert Dempster and Sons, Limited, of Elland, for a new retort-bench on Waddell's patent regenerative system, complete with all ironwork, and including a Scott and Dempster's patent travelling platform.

The Electric Ignition Company has been registered with a capital of £10,000, in £1 shares (5000 preference), to acquire the undertaking conducted by Constance Hall as the Electric Ignition Company, and to carry on the business of manufacturers of appliances of all kinds for electric ignition of internal combustion engines, &c.

A very successful exhibition was held last week by John Wright and Eagle Range, Limited, under the auspices of the Woodbridge Gas Company. Cookery demonstrations were given by Miss Mary Ball, and attracted a large attendance, resulting in the placing of a good number of cookers of all sizes. The Company have recently undertaken fittings of all kinds, and a most attractive display of all the novelties in lighting was made by their Manager (Mr. W. Orme), who also added much to the success of the exhibition by giving a practical lecture on "Gas Making," with a model plant made by himself.

The gas exhibition at Southport, to which reference was made in the "JOURNAL" last week, has still further increased the demand for stoves and heating appliances, notwithstanding the rapid increase in the number which the Corporation have issued. On March 31, 1904, there were 2950 cookers connected with the mains; on Saturday, the 25th ult., there were 5027—an increase of 2077, or 71 per cent. The exhibition, it may be remembered, was open from the 22nd to the 29th ult.; and by the time it closed, between 300 and 400 orders had been received. We learn that occupiers of trade stands in the exhibition also experienced a satisfactory demand for cookers, gas-fires, incandescent lamps, and gas washing-boilers.

The third ordinary general meeting of the Inverted Incandescent Gas-Lamp Company, Limited, was held last Friday, under the presidency of Mr. Elie Hinton. In moving the adoption of the report, the Chairman said he thought the Company might claim to have had a fairly successful year, considering the great depression in trade. The sale of burners had increased by 74,941; and that of mantles to a still greater extent, being no less than 291,972. The balance of profit amounted to £6168, which, added to the £8371 brought forward, made an available total of £14,539. Out of this sum the Directors recommended the payment of a dividend at the rate of 5 per cent., free of income-tax, which would absorb £3964, and leave a balance of £10,575 to be carried forward. The Company's system of gas lighting was now employed for railway carriages. Most successful installations had been placed in the coaches of the London, Brighton, and South Coast Railway and the Great Western Railway; and other companies had under consideration the desirability of adopting the system, it being far superior to any other at present in use, besides being more economical. Mr. J. T. Saunders seconded the motion, and it was carried unanimously. The dividend recommended was subsequently declared.

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 21.

Issue.	Share.	When ex-Dividend.	Dividend or Distribution & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
590,000	10	Oct. 13	10⅜	Alliance & Dublin 10 p.c.	21—22	..	4 15 5
160,000	10	,,	7⅛	Do. 7 p.c.	14½—15½	..	4 16 9
200,000	5	Nov. 11	6¾	Bombay, Ltd. . . .	6¾—7	+¼	4 12 10
140,000	5	,,	6¾	Do. New, £4 paid	4⅜—5¼	..	4 19 1
50,000	10	Mch. 15	14	Bourne-	29½—30½	..	4 11 10
251,810	10	,,	7	mouth Gas and Water Pref. 6 p.c.	B 7 p.c.	..	4 0 0
53,200	10	,,	6		15½—16½	..	3 12 9
380,000	Stk.	Feb. 24	12	Brentford Consolidated	247—252	+2	4 15 3
300,000	,,	,,	9	Do. New . . .	185—190	..	4 14 9
50,000	,,	,,	5	Do. 5 p.c. Pref. .	127—132	..	3 15 9
206,250	,,	Dec. 15	4	Do. 4 p.c. Deb. .	105—108	..	3 14 1
220,000	Stk.	Mch. 15	11	Brighton & Hove Orig.	223—228	..	4 16 6
246,320	,,	,,	8	Do. A. Ord. Stk. .	165—170	..	4 14 2
460,000	20	Mch. 30	10	British	40⅜—41⅛*	..	4 16 5
100,000	Stk.	Feb. 24	6	Bromley, Ord. 5 p.c. .	118—123	..	4 17 7
165,700	,,	,,	4½	Do. do. 3½ p.c. .	90—94	..	4 15 9
500,000	10	Oct. 13	7	Buenos Ayres (New) Ltd.	12½—13	..	5 7 8
250,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb. .	95—97	..	4 2 6
150,000	20	Mch. 15	8¼	Cagliari, Ltd.	25—27	..	6 2 3
100,000	10	Sept. 29	10	Cape Town & Dis., Ltd.	17—17½	+¼	5 14 3
100,000	10	Oct. 27	4½	Do. 4½ p.c Pref..	9½—10¼	..	4 7 10
50,000	50	Nov. 2	6	Do. 6 p.c. 1st Mort.	52—54	..	5 11 1
50,000	Stk.	Dec. 30	4½	Do. 4½ p.c. Deb. Stk.	100—102	..	4 8 3
1,400,000	Stk.	Feb. 24	5⅜	Commercial 4 p.c Stk. .	116—119	..	4 7 4
560,000	,,	,,	5	Do. 3½ p.c. do. .	112—115	..	4 6 11
450,000	,,	Dec. 15	3	Do. 3 p.c. Deb. Stk.	86—88	..	3 8 2
800,000	Stk.	,,	6½	Continental Union, Ltd.	113—116	..	5 12 1
200,000	,,	,,	7	Do. 7 p c Pref.	140—145	..	4 16 7
424,070	Stk.	Feb. 18	5½	Derby Con. Stk. . . .	—	..	—
55,000	,,	Jan. 3	4	Do. Deb. Stk. . . .	108—110	..	3 12 9
486,090	10	Jan. 27	11	European, Ltd. . . .	21½—22½	..	4 17 9
354,060	10	,,	11	Do. £7 10s. paid	14½—15½	..	5 6 6
15,243,200	Stk.	Feb. 10	4⅛	Gas- 4 p.c. Ord. . .	98—99	−1	4 8 11
2,600,000	,,	,,	3⅜	light 3⅜ p.c. max. . .	92—94	..	3 14 6
3,799,735	,,	,,	4	and 4 p.c. Con. Pref.	112—114	..	3 10 2
4,193,975	,,	Dec. 15	3	Coke 3 p.c. Con. Deb.	90—92	..	3 5 3
258,740	Stk.	Mch. 15	5	Hastings & St. L. 3½ p.c.	100—103	..	4 17 1
70,000	10	Sept. 29	11	Hongkong & China, Ltd.	16½—17½	+⅛	6 5 9
3,800,000	Stk.	Nov. 11	10	Imperial Continental .	218—221	+1	4 10 6
473,600	Stk.	Feb. 10	3½	Do. 3½ p.c. Deb. Red.	96—98	..	3 11 5
175,242	Stk.	Mch. 15	6	Lea Bridge Ord. 5 p.c. .	118—123	..	4 17 7
561,000	Stk.	Feb. 24	10	Liverpool United A . .	221—223	..	4 9 8
718,100	,,	,,	7	Do. do. B . .	162½—164½	..	4 5 1

Issue.	Share.	When Dividend.	Dividend or Distribution & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
306,083	Stk.	Dec. 30	4	L'rpool Unit'd Deb. Stk.	111—113	..	3 10 10
75,000	5	Dec. 15	5	Malta & Medn., Ltd. .	4—4⅛	..	5 11 1
560,000	100	Apl. 1	5	Met. of 5 p.c. Deb..	101—103*	..	4 17 1
250,000	100	,,	4½	Melbourne 4½ p.c. Deb.	101—103*	..	4 17 1
541,920	20	Nov. 11	3½	Monte Video, Ltd. . .	11—12	..	5 16 8
1,565,892	Stk.	Feb. 24	4⅝	Newc'tle & G'tesh'd Con.	107—108	..	4 5 8
406,025	Stk.	Dec. 30	3½	Do. 3½ p.c. Deb.	92—93	..	3 15 3
15,000	10	Feb. 24	10	North Middlesex 10 p.c.	19—20	..	5 0 0
52,940	1	,,	7	Do. 7 p.c.	13—14	..	5 0 0
300,000	Stk.	Nov. 30	8	Oriental, Ltd. . . .	148—151	..	5 6 0
600,000	5	Mch. 30	7	Ottoman, Ltd. . . .	6—6¼*	+¼	5 12 0
235,005	Stk.	—	6¼	Plym'th & St'house 5 p.c.	—	..	—
398,490	5	Apl. 28	6†	Primitiva Ord. . . .	6—6¼	..	4 12 4
796,980	5	Jan. 27	5	Do. 5 p.c. Pref. .	4⅞—5¼	..	4 15 3
488,900	100	Dec. 1	4	Do. 4 p.c. Deb. .	25—97	..	4 2 6
851,070	10	Oct. 13	7	River Plate Ord. . . .	13—13½	..	5 3 8
300,000	Stk.	Dec. 30	4	Do. 4 p.c. Deb. .	96—98	..	4 1 8
250,000	10	Sept. 15	7†	San Paulo, Ltd. . . .	13—13½	+½	5 3 8
70,000	50	Jan. 3	5	Do. 5 p.c. Deb. .	52—54	..	4 12 7
135,000	Stk.	Mar. 15	10	Sheffield A	234—236	..	4 4 9
209,984	,,	,,	10	Do. B	234—236	+1	4 4 9
523,498	,,	,,	10	Do. C	233—235	..	4 5 1
123,998	Stk.	Mch. 30	5	Shrewsbury Ord. 5 p.c.	102—105*	..	4 15 3
70,000	10	,,	11	South African	16—17	..	6 9 5
6,250,000	Stk.	Feb. 10	5½	South Met., 4 p.c. Ord.	129—131	..	4 4 0
1,832,700	,,	Jan. 13	3	Do. 3 p.c. Deb.	89—91	..	3 5 11
575,000	Stk.	Feb. 24	5½	S'th Suburb'n Ord. 5 p.c.	120—123	..	4 9 5
60,000	,,	,,	5	Do. 5 p.c. Pref. . .	122—127	..	3 18 9
112,533	,,	Jan. 13	5	Do. 5 p.c. Deb. Stk.	130—135	..	3 14 1
502,310	Stk.	Nov. 11	5	Southampton Ord. . . .	107—110	..	4 10 11
87,950	,,	—	4	Do. 4 p.c. Deb.	—	..	—
120,000	Stk.	Feb. 24	6¼	Tottenham A 5 p.c. .	125—128	..	4 17 8
338,120	,,	,,	4¾	and B 3½ p.c. .	97—100	..	4 15 0
125,000	,,	Dec. 15	4	Edmonton 4 p.c. Deb.	107—110	..	3 12 9
182,380	10	,,	8	Tuscan, Ltd.	9½—10½	+¼	7 16 1
149,900	10	Jan. 3	5	Do. 5 p.c. Deb. Red.	100—102	..	4 18 0
30,000	Stk.	Feb. 24	7⅛	Wands- A 5 p.c. . .	163—168	..	4 12 3
255,636	,,	,,	6¼	worth B 3½ p.c. . .	135—140	..	4 9 3
60,000	,,	,,	5 17/20	and C 3½ p.c. . .	111—113	..	4 16 0
57,564	,,	Dec. 30	3	Putney 3 p.c. Deb. Stk.	82—87	..	3 9 0
745,872	,,	Mch. 15	5	West Ham 5 p.c. Ord.	102—104	..	4 16 2
185,000	,,	,,	5	Do. 5 p.c. Pref. . .	123—126	..	3 19 4
193,300	,,	Dec. 30	4	Do. 4 p.c. Deb. Stk.	105—110	..	3 12 9

Prices marked * are Ex div. † Next dividend will be at this rate.

WANTED, FOR SALE, CONTRACT, &c. ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations Vacant.

MANAGER. Athy Gas Company.
ANALYST. No. 4375.
CARBONIZING AND WORKS FOREMAN. No. 4362.
FOREMAN. No. 4368.
FOREMAN. Londonderry Gas Company.
FOREMAN. Swadlincote Gas Works.
MAIN AND SERVICE LAYER. Coventry Gas Department.

Situations Wanted.

GENERAL ASSISTANT. No. 4371.
OUTDOOR SUPERINTENDENT. No. 4372.
CLERK. No. 4373.

Tank-Waggons to Let. Clayton Aniline Company.

Plant, &c., for Sale.

ENGINES. Sheffield Water-Works
PUMPING ENGINE, PUMPS, &c. Birmingham Water Department.
PURIFIERS, &c. Redditch Gas Company.
STATION METER, GOVERNOR, &c. Dumfries Gas Commissioners.
TOWER SCRUBBERS. Stourbridge Gas Company.

Stocks and Shares.

BOURNEMOUTH GAS AND WATER COMPANY. April 13.
GREAT YARMOUTH WATER COMPANY. April 11.
HORLEY GAS COMPANY. April 11.
HORNSEY GAS COMPANY. May 4.
ILFORD GAS COMPANY. April 11.
PINNER GAS COMPANY. April 15.
SOUTHEND WATER COMPANY. April 11.
SOUTH ESSEX WATER COMPANY. April 11.

TENDERS FOR

Coal and Cannel.

DUNDEE GAS DEPARTMENT. Tenders by April 8.
LIVERPOOL GAS COMPANY. Tenders by April 17.
WALLASEY GAS AND WATER DEPARTMENT. Tenders by April 20.

Cocks, Main Taps, Valves, &c.

WALLASEY GAS AND WATER DEPARTMENT. Tenders by April 20.

Fire-Clay Goods.

WALLASEY GAS AND WATER DEPARTMENT. Tenders by April 20.

General Stores, Lead and Copper Tubs, Iron Oils and Paints, &c.

WALLASEY GAS AND WATER DEPARTMENT. Tenders by April 20.

Meters (Gas and Water).

WALLASEY GAS AND WATER DEPARTMENT. Tenders by April 20.

Pipes, &c.

WALLASEY GAS AND WATER DEPARTMENT. Tenders by April 20.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

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Payable in Advance. If credit is taken, the charge is 25s. a year.

Abroad (in the Postal Union): £1 7s. 6d., payable in Advance.

All Communications, Remittances, &c., to be addressed to
WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C.
Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

OXIDE OF IRON.

O'NEILL'S OXIDE has a larger annual sale than all other Oxides combined.
SPENT OXIDE purchased in any district.
GAS PURIFICATION & CHEMICAL CO., LD.
JOHN WM. O'NEILL, Managing Director,
PALMERSTON HOUSE, LONDON, E.C.

WINKELMANN'S
"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for GAS-WORKS.
ANDREW STEPHENSON, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

SULPHURIC ACID for Sale, specially suitable for making Sulphate of Ammonia.
BROTHERTON AND CO, LTD., Chemical Manufacturers.
Works: BIRMINGHAM, LEEDS, and WAKEFIELD.

HYDRATED OXIDE OF IRON.
PREPARED from Pure Iron.
Twice as Rich as Bog Ore.
Gives no Back Pressure.
The Cheapest in the Market.
Can be Exchanged for Spent Oxide.
READ HOLLIDAY AND SONS, LTD., HUDDERSFIELD.

GAS TAR wanted.
BROTHERTON AND CO., LTD., Tar Distillers.
Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, AND WAKEFIELD.

SULPHATE OF AMMONIA SATURATORS and all LEAD and TIMBER WORK in Connection with Sulphate Plants.
We guarantee promptness, with efficiency for Repairs.
JOSEPH TAYLOR AND CO., CENTRAL PLUMBING WORKS, BOLTON.
Telegrams: SATURATORS, BOLTON. Telephone 0848.

GASHOLDER PAINTING.
PAINTING Work for all kinds of Gas- Works Plant undertaken by contract or otherwise.
FREDERICK BOYALL, 31, Regent's Row, Queen's Road, DALSTON, N.E. Established 1850.

"VITERNUS" METALLIC PAINT FOR GAS-WORKS PLANT.
JOHN E. WILLIAMS AND CO.,
LOWER MOSS LANE,
MANCHESTER, S.W.
Telegrams: "ENAMEL." National Telephone 1759.

AMMONIACAL Liquor wanted.
BROTHERTON AND CO., LTD., Ammonia Distillers.
Works: BIRMINGHAM, GLASGOW, LEEDS, LIVERPOOL, AND WAKEFIELD.

ATTERTON'S Patent Charging Machine, especially adapted for Small Works up to 50 Millions. Nearly 40 already supplied, and still supplying. Would soon repay for small outlay. Increased make and reduction in cost.
Apply to E. PADFIELD AND CO., 96 & 98, Leadenhall Street, LONDON, E.C.

BROTHERTON & CO., LIMITED.
Offices: Commercial Buildings, LEEDS.
Correspondence invited.

BIGGS, WALL, & CO., 13, Cross Street, Finsbury, E.C. *Telegrams:* "RAGOUT," LONDON. *Telephone:* 273 CENTRAL.
SATURATORS—See Advt. in last week's issue.
SULPHATE PLANTS—See Advt. in this week's issue.
CHARGING MACHINERY—See Advt. in next week's issue.

PATENTS AND TRADE MARKS PUBLICATIONS, "MERCHANDISE MARKS ACT, and Decisions thereunder," 1s.; "TRADE SECRETS v. PATENTS," 6d.; "DOCTRINE of EQUIVALENTS, Mechanical and Chemical," 6d.; SUBJECT-MATTER of PATENTS," 6d.
MEWBURN, ELLIS, & PRYOR, Chartered Patent Agents, 70 and 72, Chancery Lane, London, W.C. Telegrams: "Patent London." Telephone: No. 243 Holborn.

JOHN RILEY & SONS, Chemical Manu- facturers, Hapton, near Accrington, are MAKERS of Special SULPHURIC ACID, for Sulphate of Ammonia Making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol, which has now been used for upwards of 50 Years. References given to Gas Companies.

J. & J. BRADDOCK (Branch of Meters Limited), Globe Meter Works, OLDHAM, and 45 & 47, Westminster Bridge Road, LONDON, S.E.
WET AND DRY GAS-METERS, PREPAYMENT METERS, STATION METERS, AND GOVERNORS.
REPAIRS RECEIVE PROMPT ATTENTION.
Telephones: 254 Oldham, and 2412 HOP, London.
Telegrams:—
"BRADDOCK, OLDHAM," and "METRIQUE, LONDON."

DUTCH OXIDE OF IRON.
SPENT OXIDE PURCHASED IN ANY DISTRICT.

THE First Dutch Bogore Co., Ltd., HOLLAND.
General Manager (for England and Wales)—
CHARLES E. FRY, LEAMINGTON.
General Manager (for Scotland)—
J. B. MACDERMOTT, 11, Bothwell St., GLASGOW.

GLASS SHADES of every description, for all kinds of Interior **GAS LIGHTING.** Illustrated sheets on application.
JOHN WALSH WALSH,
SOHO AND VESTA GLASS WORKS, BIRMINGHAM.
Telegrams: "VESTA, BIRMINGHAM."
National Telephone: No. 63.
London Show-Room: 4, HOLBORN CIRCUS, E.C.

GAS TAR and AMMONIACAL LIQUOR wanted by
GEORGE MILLER AND CO., Tar Distillers,
40, West Nile Street, GLASGOW.

SPENT OXIDE.
THE South Metropolitan Gas Company are always open to receive OFFERS of SPENT OXIDE.
Chief Office: 709, Old Kent Road, London, S.E.
Telegrams: "METROGAS, LONDON."

CLERK (Age 23), seeks situation. Thorough knowledge of Book-keeping and general Accountancy. Shorthand. Typist. Best References.
Address No. 4373, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a situation as General ASSISTANT on a Gas-Works. Served articles with Gas Engineer and Manager. Good Carbonizer, Analyst, and Draughtsman, and a thorough all-round knowledge of the General Routine of a Gas-Works. Five Years' Experience. Salary moderate. Would make appointment.
Address No. 4371, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

GAS Manager wanted to Take Charge of Works. Salary £80 per annum, to be increased by yearly increments of £5 up to £100, provided satisfaction is given, with comfortable House, large Garden, Fuel, and Light.
For Particulars of duties apply to MICHAEL ANTHONY, Secretary, Gas-Works, ATHY.

ANALYST required for Provincial Gas- Works, accustomed to the usual Tests for Illuminating Power; also Analyses of Gases, Residuals, &c.
Apply, by letter, stating Age, Qualifications, Salary required, and References, to No. 4375, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

OUTDOOR SUPERINTENDENT.
AN Energetic, Tactful Man, Age 35, who has for the last Ten Years successfully Managed a small Gas Undertaking, will shortly be free and prepared to take over a post as above. Well up in Main and Service Laying, General Gas-Fitting, able to advise on all matters connected with uses of Gas, prepare Estimates, and able to take Sole Charge of the Distribution Department. Moderate Salary.
Address No. 4372, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

LONDONDERRY GASLIGHT COMPANY.
GENERAL FOREMAN
WANTED by the above Company.
Must be good Carbonizer, accustomed to Inclined Retorts, Water-Gas Manufacture, Sulphate of Ammonia, and all usual Testing for Impurities, &c., and able to prepare all working cost. Good House, Coal, and Gas provided.
Apply, giving all Particulars and Wages required, to
R. J. SKINNER.
Manager and Secretary.
Lecky Road, March 23, 1905.

OXIDE OF IRON.
(NATURAL.)
BALE & CHURCH will be pleased to send Quotations and Samples on application.
SPENT OXIDE PURCHASED.
BALE'S FIRE CEMENT for all Retort and Furnace work.
PAINT for Gasholders, Purifiers, &c.
5, CROOKED LANE, LONDON, E.C.

SULPHURIC ACID.
SPECIALLY prepared for the Manu- facture of SULPHATE OF AMMONIA.
SPENCER, CHAPMAN, AND MESSEL, LIMITED, 36, Mark Lane, LONDON, E.C. Works: SILVERTOWN.
Telegrams: "HYDROCHLORIC, LONDON."
Telephone: 341, AVENUE.

GAS-WORKS FOREMAN.
WANTED, in Scotland, for a Works making 140 Millions, a smart, reliable, FOREMAN. Must be Married, capable of controlling workmen, thoroughly steady, with an intimate knowledge of Regenerative Settings, Boilers, and Gas-Works machinery. Wages 46s. per week to commence.
Apply, stating Age, previous Experience, and giving References, to No. 4368, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

CARBONIZING AND WORKS FOREMAN.
WANTED, immediately, an Ex- perienced Reliable Man as GENERAL CARBONIZING and WORKS FOREMAN, for a Works producing 500 Millions per Annum. Must understand all Machinery used in connection with Gas-Works, and have held a similar appointment. House, Coke, and Gas provided.
Apply, with not more than Three References, stating Experience, Age, and Wages required, to No. 4362, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, at once, a General Working FOREMAN. Must be a good Carbonizer, accustomed to Generator and Regenerative Settings, Sulphate of Ammonia Plant, Laying Mains, Services, and all General Repairs, and able to Take Charge in the absence of the Manager.
Wages, 30s. per week, with House, Gas, and Coals free.
Apply (References only), stating Age, and when able to commence, on or before Twelve noon, April 10 next, endorsed "Foreman," to Mr. G. B. SMEDLEY, Engineer and General Manager, Gas-Works, Swadlincote, near BURTON-ON-TRENT.

FIRST-Class Main and Service Layer required. Must be accustomed to laying large size Mains and Taking Charge of large Gang of Men.
Applications, with Wages required, to be made in writing to the MANAGER, Gas-Works, COVENTRY.
March 29, 1905.

TO LET ON HIRE.
CYLINDRICAL Tank - Waggons, suitable for the carriage of Benzol or Crude Naphtha.
Apply CLAYTON ANILINE COMPANY, LIMITED, Clayton, MANCHESTER.

NEW Gasholder, 40 ft. diameter by 12 ft. deep, with Steel Standards; also new STEEL TANK to contain same.
Write J. WRIGHT, 181, Queen Victoria Street, LONDON, E.C.

REDDITCH GAS COMPANY.
PURIFIERS—Set of Four for Sale, 12 ft. by 12 ft. by 4 ft. 6 in. (faced joints), complete with Grids, Weck's Centre Valve, and 10-inch Connections. All in First-Class condition. Replacing with larger.
Particulars from ALBERT E. LAYTON, Manager.

TEST PLANT FOR SALE—We have several small Sets of GAS APPARATUS suitable for Test Plants, including Retorts, Condensers, Scrubber, Purifiers, Gasholders, overhauled and guaranteed, or New throughout.
FIRTH BLAKELEY AND CO., Thornhill, DEWSBURY.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also a few COMPLETE WORKS. Compare Prices and Particulars before ordering elsewhere.
J. F. BLAKELEY, Gas Engineer, Thornhill, DEWSBURY.

ROBERT DEMPSTER & SONS, Ltd., Contractor for Complete CARBONIZING PLANTS and every description of GAS APPARATUS and ELEVATING and CONVEYING PLANT, ROSE MOUNT IRON-WORKS, ELLAND.

FOR Sale, cheap, a Wrought-Iron SCRUBBER, 20 ft. high by 3 ft. diameter, with 6-inch Valves and Connections.
COCKEY'S WASHER, to pass 100,000 cubic feet per diem., with 6-inch Valves and Connections.
Apply to SAML. WHILE AND SON, 60, QUEEN VICTORIA STREET, E.C.

PURIFIERS, &c., FOR SALE—Sets of 4 ft., 5 ft., 6 ft., 8 ft., 9 ft., 10 ft., 12 ft., 18 ft. squares; also 16 ft. by 12 ft., &c. SCRUBBERS, 8 ft. by 60 ft. 10 inch, 18 inch Square METERS. EXHAUSTERS up to 50,000 feet per hour in Stock. GASHOLDERS and TANKS, also New. State requirements
FIRTH BLAKELEY AND CO., Thornhill, DEWSBURY.

SHEFFIELD CORPORATION WATER-WORKS.

LANGSETT RESERVOIR.

FOR SALE—Two 10-Horse Power Portable ENGINES by Clayton and Shuttleworth. Both in thorough working order and repair.
For Price and Particulars, apply to W. TERREY, General Manager, Water Department, Town Hall, SHEFFIELD.

WATER-WORKS PUMPING-ENGINE FOR SALE.

MODERN Compound Surface Condens- ing PUMPING-ENGINE and WELL PUMPS for a depth of 200 feet. Engine Cylinders, 25 inches and 54 inches by 5 feet Stroke. Pump 24 inches diameter.
STEEL RISING MAIN, with lowering Rods and Screws.
Further Particulars and order to view to be obtained from the SECRETARY, Corporation Water Offices, BIRMINGHAM.

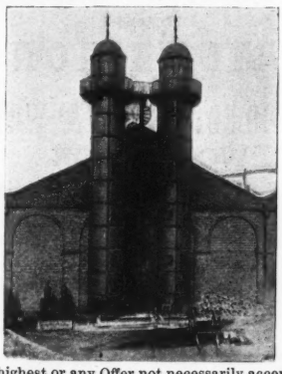
DUMFRIES CORPORATION GAS-WORKS.

STATION METER AND GOVERNOR FOR SALE.

THE Dumfries Gas Commissioners have FOR SALE a STATION METER of 15,000 cubic feet per hour capacity, with 10-inch Valves and Bye-Pass, of modern construction, and in splendid condition. It has been replaced by a much larger Meter of the same pattern and by the same Maker—viz., Messrs. J. & J. Braddock, Oldham. Also a 12-inch Milne GOVERNOR converted to Cowan's Patent, with screw-down Valves and Bye-Pass complete.
These are standing intact as erected; and every facility will be given for internal inspection.
For further Particulars, apply Mr. MALAM, Engineer, Gas-Works.

URBAN DISTRICT COUNCIL OF STOURBRIDGE.
(GAS DEPARTMENT.)

THE Gas Committee have For Sale, as they stand, a pair of TOWER SCRUBBERS, each 50 feet by 8 feet, in really good working order, and are offered on account of being now too small.



The highest or any Offer not necessarily accepted.
By order of the Committee,
WM. NORTH,
Engineer and Manager.

LIVERPOOL UNITED GASLIGHT COMPANY.

TENDERS FOR CANNEL AND COAL.

THE Directors of the Liverpool United Gaslight Company are prepared to receive TENDERS for the supply of 70,000 Tons of CANNEL, and 200,000 Tons of COAL, to be delivered at the various Works of the Company during the period of Twelve Months, between the 1st of July, 1905, and the 30th of June, 1906.
Tenders will be received for the whole or any portion of the above quantity.
The Directors reserve the right to accept Tenders for the whole or any portion of the quantity offered, and do not bind themselves to accept the lowest or any Tender.
Full Particulars and Printed Forms of Tender can be obtained on application to the undersigned, at the Gas Office, Duke Street, Liverpool, to whom sealed Tenders (on the printed Form only) must be delivered, at or before Ten a.m. on Monday, April 17, endorsed "Tender for Cannel and Coal."
By order,
EDWARD ALLEN,
Engineer.
Gas Office, Duke Street,
Liverpool, March 22, 1905.

DUNDEE GAS COMMISSIONERS.
(DUNDEE CORPORATION.)

TENDERS FOR COAL.

THE Dundee Gas Commissioners are prepared to receive TENDERS for the supply of GAS COAL, SPLINT, and COKING COAL and NUTS, for delivery over a period, in the option of the Commissioners, of Six, Nine, or Twelve Months.
Offers must be made on a Printed Form of Tender, which embodies the Conditions of Contract, and which may be obtained on application to the undersigned.
The Commissioners reserve the power to accept any Quantity they may think fit of any Tender, or to reject any or all of the Tenders.
Sealed Offers, endorsed "Tenders for Coal," to be lodged with Wm. H. Blyth Martin, Esq., Clerk to the Commissioners, City Chambers, Dundee, on or before Saturday, April 8 next.
ALEX. YUILL,
Engineer and Manager.
Gas-Works, Dundee,
March 24, 1905.

WALLASEY URBAN DISTRICT COUNCIL.
(GAS AND WATER DEPARTMENT.)

TO COLLIERY PROPRIETORS AND OTHERS.

THE Wallasey Urban District Council are prepared to receive TENDERS for the supply of about 5000 Tons of Round CANNEL and about 29,000 Tons of screened GAS COAL, delivered in accordance with the terms of the Specification prepared by, and obtainable at the Office of, Mr. J. H. Crowther, Dock Road, Seacombe.
Sealed Tenders, addressed to the undersigned and endorsed "Tender for Coal," Gas and Water Department, to be delivered per post, at my Office as below, not later than the morning of Thursday, the 20th of April, 1905.
The Contractor or Contractors will be required to enter into a bond, with approved sureties, for the due performance of his or their Contract.
The Council do not bind themselves to accept the lowest or any Offer.
By order,
H. W. COOK,
Clerk and Solicitor.
Public Offices, Egremont,
Cheshire, March 28, 1905.

WALLASEY URBAN DISTRICT COUNCIL.
(GAS AND WATER DEPARTMENT.)

CONTRACTS FOR STORES.

THE Wallasey Urban District Council are prepared to receive TENDERS to supply, for a period of Twelve Months from the 30th of June next, the following among other Articles; being the principal STORES required for use at their Gas and Water Works—viz.,

Wrought-Iron Tube.	Wrought-Iron Bars and Steel Plates.
Stop-Cocks and Main Taps.	Cast-Iron Main Pipes.
Lead Pipe, &c.	Oils and Paints.
Copper Tube, Sheets, &c.	Valves.
	Gas and Water Meters.
	Retorts and Fire-Bricks.

Further Particulars, with Form of Tender, may be had, and Samples inspected, on application at the Gas and Water Engineer's Office, Dock Road, Seacombe.
Sealed Tenders, which must be on the printed Form, endorsed "Tender for Gas and Water Stores," to be addressed to me and delivered (per post) at my Office as below, not later than the morning of Thursday, the 20th of April, 1905.
The Contractors will be required to enter into a bond, with approved sureties, for the due performance of their respective contracts.
The Council do not bind themselves to accept the lowest or any Offer.
By order,
H. W. COOK,
Clerk.
Public Offices, Egremont,
Cheshire, March 28, 1905.

HORNSEY GAS COMPANY.

NOTICE is Hereby Given, that the Hornsey Gas Company offer for SALE BY TENDER £4100 CONSOLIDATED STOCK (being a portion of £50,000 Additional Capital authorized to be raised under the Hornsey Gas Order, 1902), and they will be prepared to receive sealed Tenders for the whole or part of such Stock not later than Twelve o'clock noon on Thursday, the 4th day of May, 1905.
The amount of the Stock allotted must be paid up in full on or before the 18th day of May, 1905. Interest will commence to accrue on the 1st day of June, 1905.
The Interest on the Stock will be calculated Half Yearly to the 31st of December and the 30th of June in each Year, and be paid by warrants issued immediately after the Half-Yearly Meetings of the Company—usually in March and August respectively in each Year.
No deposit is required upon Tendering. Any amount not being less than £10 or a multiple thereof may be Tendered for; and the Stock will be registered in the Company's books in the names of the allottees or their nominees free of expense.
The Minimum price—below which no Tender will be accepted—has been fixed at One Hundred and Eighty Pounds (£180) for each One Hundred Pounds of Stock.
The last dividend declared on the Consolidated Stock was at the rate of 9½ per cent. per Annum. £100 of the Stock purchased at £180 will yield to the investor, at the rate of dividend referred to, £5 5s. 7d. per cent. per Annum.
Particulars and Conditions of Sale, with printed Form of Tender attached thereto (upon which Form only Tenders will be received), may be obtained at the Company's Offices, No. 63, Chancery Lane, W.C., between the hours of Ten o'clock a.m. and Four o'clock p.m., Saturdays Ten a.m. to One p.m.
By order,
WILLIAM E. ROBERTS,
Secretary.
Hornsey Gas Company,
Offices: 63, Chancery Lane,
London, W.C., March 30, 1905.

HORNSEY GAS COMPANY.

SALE BY TENDER OF £2500 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

THE Directors invite Tenders for £2500 Four per cent. PERPETUAL DEBENTURE STOCK authorized to be raised in accordance with the provisions of the Hornsey Gas Order, 1902, and by a resolution passed at an Extraordinary General Meeting of the Proprietors held on the 19th day of December, 1902, to be paid up in full on or before the 18th day of May, 1905.
Particulars and Conditions of Sale with Form of Tender may be seen on application at the Offices of the Company, and sealed Tenders must be sent in not later than the 4th day of May, 1905.
By order of the Board,
WILLIAM E. ROBERTS,
Secretary.
Offices: 63, Chancery Lane,
London, W.C., March 30, 1905.

PINNER GAS COMPANY, LIMITED.

SALE BY TENDER OF 400 "B" SHARES OF £5 EACH.
MINIMUM PRICE £6 15s. PER £5 SHARE.

NOTICE is Hereby Given, that it is the intention of the Directors of this Company to SELL BY TENDER 400 "B" SHARES of £5 each; being a portion of the Additional Capital authorized by the Pinner Gas Order, 1901.
The Shares will be allotted to the highest bidders; but no Tender will be accepted at a lower price than £6 15s. per £5 Share.
The last dividend was at the maximum rate of £7 per cent. per Annum; but in future, it may be increased as the price of gas is reduced.
No Tender will be received after Twelve o'clock on Saturday, the 15th day of April, 1905.
Particulars and Forms of Tender can be obtained on application to the Secretary.
By order,
WM. WMS. BOX.
Secretary.
28, Great James Street,
Bedford Row, London, W.C.,
March 31, 1905.

ISSUES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MR. ALFRED RICHARDS begs to notify that his ISSUES by AUCTION under PARLIAMENTARY POWERS of STOCKS and SHARES in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.
Terms for Issuing such Capital, and also for including Gas and Water Stocks and Shares belonging to Private Owners in these Periodical Sales, can be obtained on application at MR. ALFRED RICHARDS' OFFICES, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
SOUTH ESSEX WATER-WORKS COMPANY.

NEW ISSUE OF £15,000 FIVE PER CENT. PREFERENCE STOCK.

MR. ALFRED RICHARDS will Sel the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, April 11, at Two o'clock precisely, in Lots.
Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
GREAT YARMOUTH WATER-WORKS COMPANY.

NEW ISSUE OF 300 £10 ORDINARY SHARES AND £2000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, April 11, at Two o'clock, in Lots.
Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Directors of the
ILFORD GAS COMPANY.

NEW ISSUE OF £10,000 ORDINARY "C" STOCK, AND £5000 FOUR PER CENT. PERPETUAL DEBENTURE STOCK.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, April 11, at Two o'clock, in Lots.
Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

By order of the Executors of Mrs. Hannah Stevens (deceased) and other Owners.
WATER AND GAS STOCKS AND SHARES
IN THE
SOUTHEND WATER-WORKS COMPANY and the HORLEY DISTRICT GAS COMPANY.

MR. ALFRED RICHARDS will Sell the ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, April 11, at Two o'clock, in Lots.
Particulars of the AUCTIONEER, 18, FINSBURY CIRCUS, E.C.

BOURNEMOUTH GAS AND WATER COMPANY.

ISSUE OF £10 SEVEN PER CENT. "B" SHARES.

MINIMUM PRICE OF ISSUE £15 PER SHARE.

SALE BY TENDER OF 2000 £10 SEVEN PER CENT. "B" SHARES,

in pursuance of the provisions of the Bournemouth Gas and Water Act, 1896.

NOTICE is Hereby Given, that it is the intention of the Directors of this Company, to SELL BY TENDER 2000 "B" SHARES of £10 each (the Dividend on which is limited to £7 per cent.) to be paid up in full on or before the 31st of May, 1905.

The Company are now engaged in the erection of new Gas-Works at Poole, with all the latest improvements; and the Capital now offered is required for this purpose and also for extention of the Company's existing Works and Plant, to enable them to meet the increased demand for Gas and Water, by reason of the continued development of the district supplied by the Company.

The Dividend on the Ordinary Shares for the Half-Year ended the 31st of December, 1904, was at the rate of Ten per cent. per Annum, with an addition at the rate of Four per cent. per Annum, under the Sliding-Scale, and on the "B" Shares at the rate of Seven per cent. per Annum.

Since the 31st of December, 1888, to the 31st of December, 1903, the Dividend on the Ordinary Shares has been at the rate of 13 per cent. per annum.

The net Profit earned in the Year ended the 31st of December, 1904, after deducting all charges, including Debenture Interest, amounted to £32,074 18s. 8d., which sum was available for payment of Dividends. During the same Twelve Months the sum of £2000 was added to Reserve Fund from profits, and also £705 19s. 7d., from interest on Reserve Investments, and, after payment of Dividends to the 31st of December, 1904, the sum of £8979 1s. remained to be carried forward to the Half-Year ending 30th of June, 1905.

Particulars and Conditions of Tender may be obtained at the Company's Offices, Bournemouth and Poole; or of the Secretary as under.

Sealed Tenders must be sent to the Secretary not later than Eleven o'clock on Thursday morning, the 13th of April, 1905.

By order,
WILLIAM CASH,
Secretary.

London: 90, Cannon Street, E.C.,
March 23, 1905.

Price 1s. Post Free.

A MEMORANDUM
ON THE
MOND GAS SCHEME
By F. N. KEEN,
Of the Middle Temple, Barrister-at-Law.

The Pamphlet contains a Summary of the Principal Provisions of the South Staffordshire Mond Gas (Power and Heating) Company's Act, 1901, and of some of the matters raised in evidence before the Parliamentary Committees that dealt with the Bill.

LONDON:
WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

ALEXANDER CAMERON,
GAS AND CANNEL COAL MERCHANT
48, WEST REGENT STREET,
GLASGOW.

Gas Companies are solicited to try Samples of the
MIRFIELD GAS COAL
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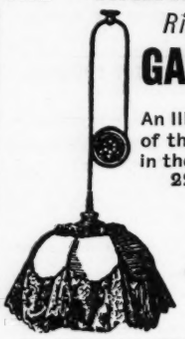

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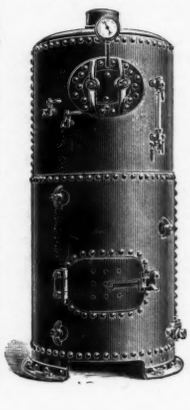

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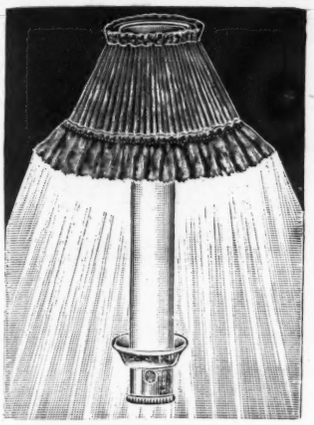

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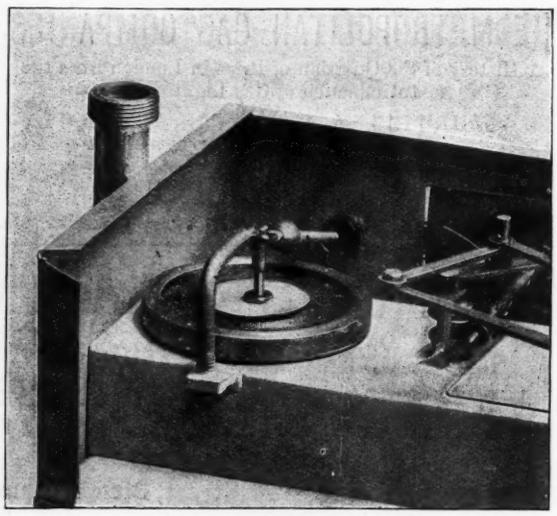

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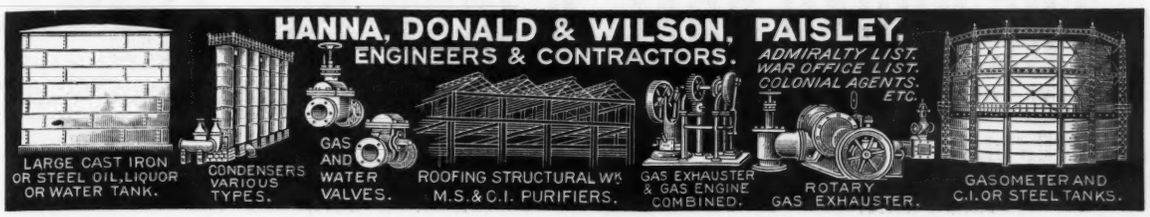
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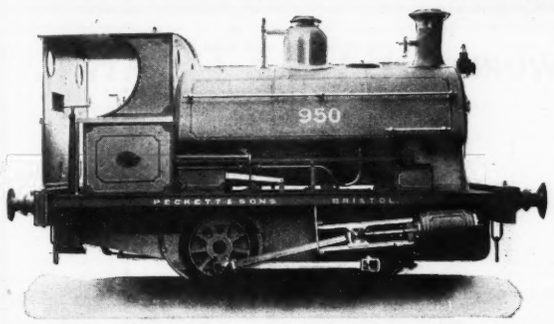

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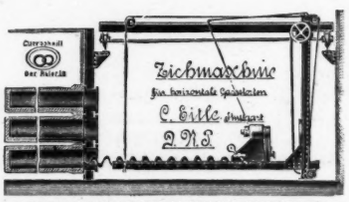

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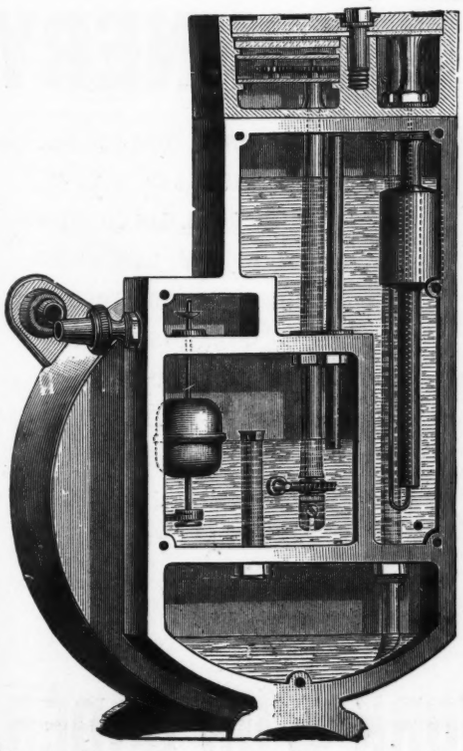

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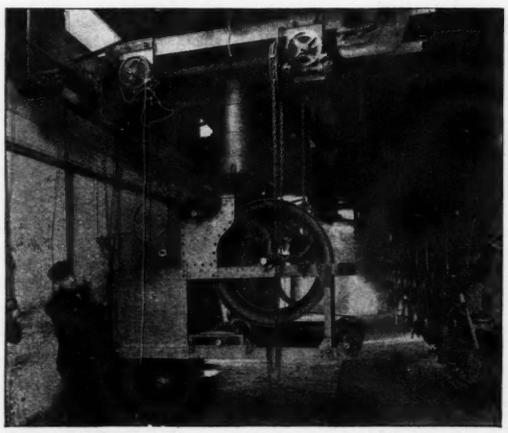

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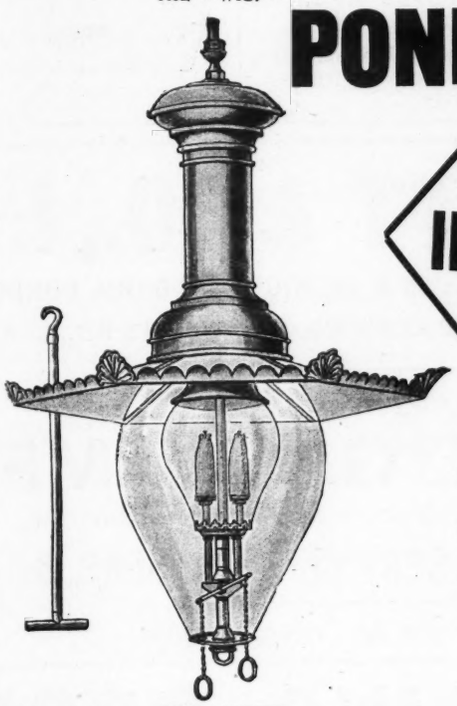

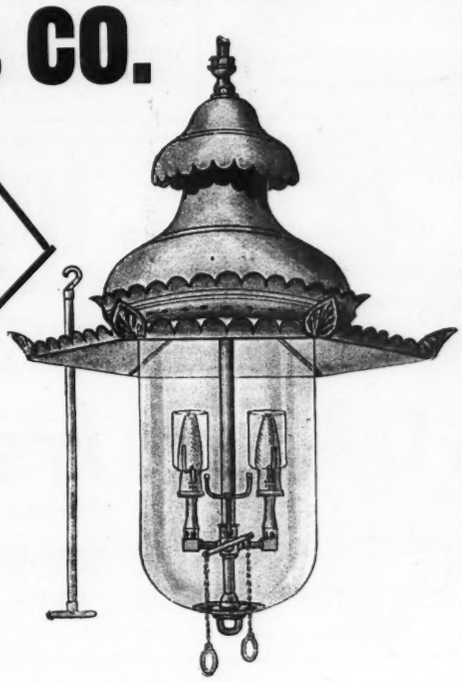

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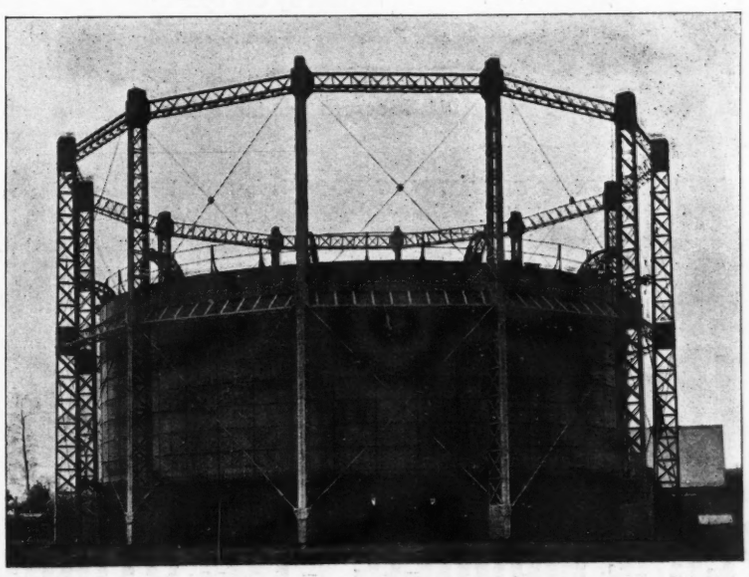

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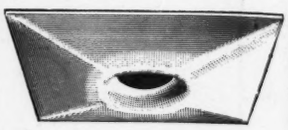

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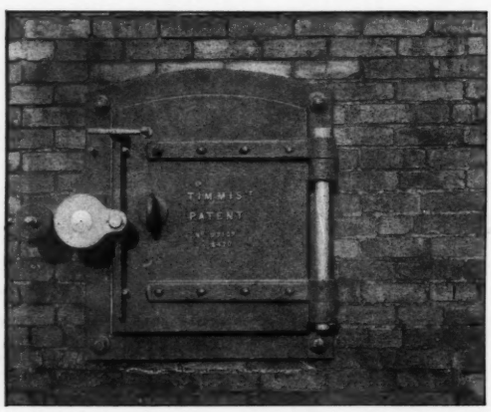
DRY GAS-METERS, SERVICE-CLEANSERS, &c., &c.

PRICE LISTS ON APPLICATION.

TIMMIS'S PATENT CLINKERING DOOR.

It is a well-known fact that the ordinary Clinkering Door which is fastened only at the middle almost invariably warps with the heat, thereby **admitting primary air in unknown quantities and in the wrong place.** Where two fastenings are used to either single or double doors it is impossible to apply equal pressure with them, and as a rule only one of them is used, the results being worse than with the single fastening. With Timmis's Patent it is impossible to avoid putting equal pressure on both top and bottom and with the same ease as with the old single fastening.



Advantages.

1. It renders **warping impossible.**
2. **No primary air** can pass into the furnace **between the Door and the Frame.**
3. It is **the only Clinkering Door** that can be **sealed top and bottom by the operation of one fastener.**
4. There are **no complicated parts** to wear or get out of order.
5. **Double Doors** can be **dispensed with.**
6. It occupies **no more room than the ordinary door.**

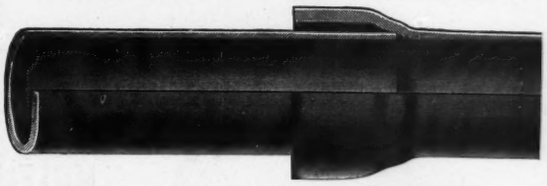
DESCRIPTION OF DOOR.

TIMMIS'S PATENT CLINKERING DOOR is fastened by means of a vertical bar pivoted in the centre and provided with a screw at the top end. When the screw is tightened, the lower end of the bar is pressed with equal force against the lower corner of the door. **The two corners are therefore subject to equal pressure and warping is impossible.** To release the door the screw is loosened, and the bar, which is balanced by a counter-weight and rotates upon a strong pin attached to the frame, is moved clear of the door. The sketch above shows the position of the bar when the door is closed.

Further Particulars and Prices on Application to the Patentee:

GEO. H. TIMMIS, RIVER STOUR WORKS, STOURBRIDGE.
Telegrams: "TIMMIS, LYE." National Telephone: 13 LYE.
OR OF **HARPER & MOORES, LTD., STOURBRIDGE.**

MANNESMANN



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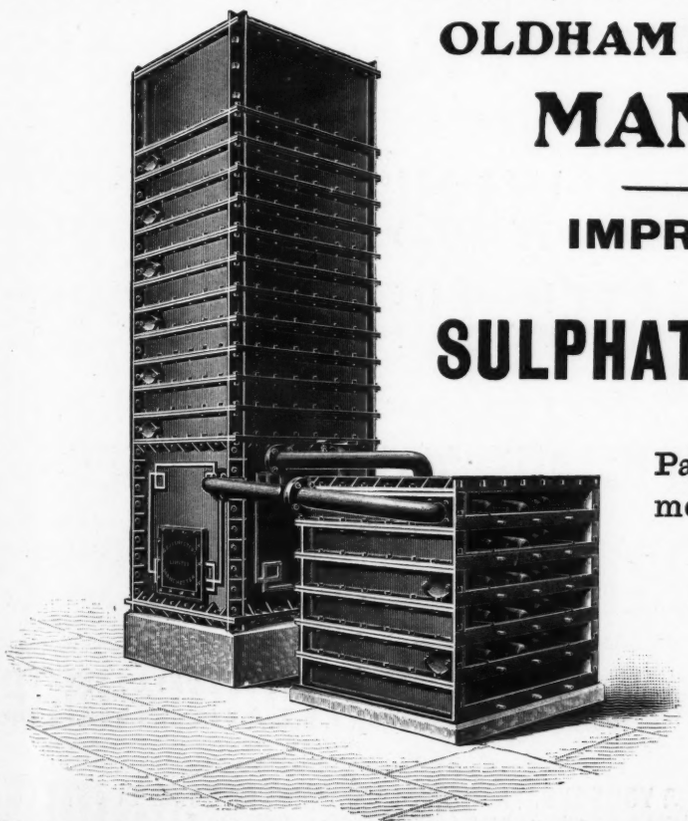

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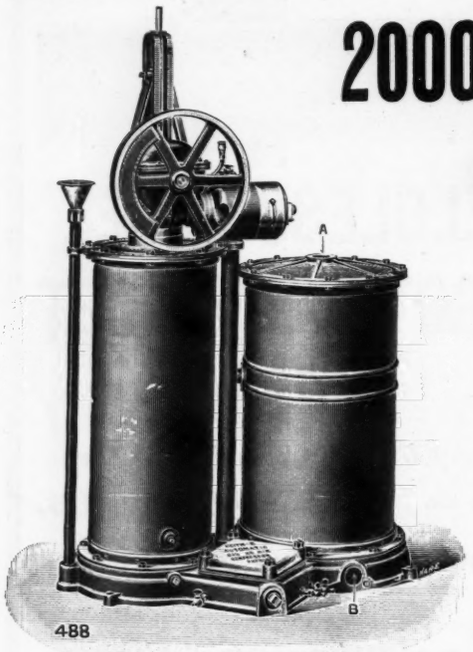

2000 INSTALLATIONS NOW IN USE.

KEITH'S PATENT ELECTRICALLY DRIVEN COMPRESSOR.

Capacity 500 cubic feet per hour, current consumption 1/15 unit per hour.

Fitted with worm gearing running in oil bath, and perfectly silent in working.

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PATENTEES AND MANUFACTURERS—

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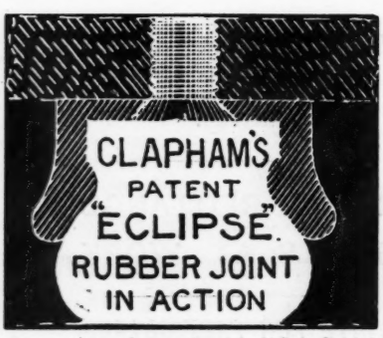
Laycock & Clapham's Patent **"ECLIPSE" WASHER-SCRUBBER**

Clapham's Patent **"ECLIPSE" WATER-TUBE CONDENSER**

Clapham's New Century Cover, with Patent



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Printed for WALTER KING by King, Sell, & Olding, Ltd.; and published by him at 11, BOLT COURT, FLEET STREET, in the CITY OF LONDON.—Tuesday, April 4, 1905.